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PREHISTORY

CAMBRIDGE
UNIVERSITY PRESS
LONDON: Fetter Lane

NEW YORK
The Macmillan Co.
BOMBAY, CALCUTTA and MADRAS
Macmillan and Co., Ltd.
TORONTO
The Macmillan Co. of Canada, Ltd.
TOKYO
Maruzen-Kabushiki-Kaisha

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The "Sorcerer" at the cave of Trois Frères (*after Breuil*)

PREHISTORY

A STUDY OF EARLY CULTURES IN EUROPE AND THE MEDITERRANEAN BASIN

BY

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WITH A SHORT PREFACE BY

L'ABBÉ H. BREUIL

PROFESSOR AT THE INSTITUTE
OF HUMAN PALAEONTOLOGY, PARIS

SECOND EDITION

GN
775
B9
1925

CAMBRIDGE
AT THE UNIVERSITY PRESS
1925

25681

First Edition 1921
Second Edition 1925

PRINTED IN GREAT BRITAIN

PREFACE

TO THE SECOND EDITION

PREHISTORY is a developing study and our knowledge of the subject is continually growing. Owing to the inherent difficulty of forecasting exactly the life of a first edition, most of the corrections and additions for this edition were, as a matter of fact, prepared some time ago. A short summary, however, of the very latest discoveries is included in the present Preface.

As regards the geological section, it is being more and more demonstrated—at any rate for Southern and Eastern England—that a considerable depression, on a continent-building scale, took place from the end of Chellean times, with subsequent uplift in Mousterian times. At what moment the uplift ceased is uncertain, but probably the major part took place by the end of Mousterian times. There is evidence that the movement was greater towards the South of England, though in North France it appears to die away, the movement in the Somme valley being but relatively slight. In reading the geological section these facts should be kept in mind.

As regards the Mousterian Culture this has now been discovered in the Shensi province of Northern China by Père Teilhard; it occurs also in South Siberia—probably an Upper Mousterian. It seems evident that the migrations of early Man followed the loess land, i.e. the open country. Evidence is accumulating to show that the Mousterian Culture "straddled" across Würmian times. At a cave near Trieste Mousterian industries are stated to be just post-Würmian; at Cotencher (see p. 44) they are just pre-Würmian in age. On the other hand it is increasingly evident that the climate at the maximum of the Würm glaciation was not necessarily everywhere at its coldest; humidity affects matters considerably, and in North Spain, for example, the coldest moment—using the fauna as a thermometer—appears to have been in the cold *dry* period from the end of Aurignacian times.

There is little further to add concerning the Upper Palaeolithic Cultures apart from fresh "art" discoveries. A rather anomalous find of a Lower Aurignacian industry with Châtelperron points is reported from the borders of Poland and Russia. The Lower Aurignacian is generally absent from Eastern Europe, and further work is required to determine the relationships and source of origin of this new find.

Evidence is accumulating to prove my conjecture that only a very late Magdalenian Culture penetrated into England, and then solely in the South West. Recent diggings by A. L. Armstrong at Cresswell Crags are demonstrating a continuous development of the Aurignacian analogous to that which has been found at Mentone. Any art finds there, too, are of a primitive technique.

Although it has been claimed that Solutrean and Magdalenian Cultures occur in Egypt there is, as yet, no evidence that such is the case. It is difficult also to see how these Cultures could have arrived, as no possible connecting link has been found. Further, the Egyptian industries include sickles and pottery—essentially Neolithic characteristics.

A new Transitional Culture (described by me in vol. IV. part 1, of the *Proceedings of the Prehistoric Society of East Anglia*) has been discovered in North Spain. It is known as the "Asturiense" Culture and there is a very characteristic tool made from a river pebble—the Asturiense pick. Stratigraphically this Culture is just post-Azilian in age, but it is considered to be of Transitional date owing to the absence of pottery and domestic animals. The finds occur for the most part, though not everywhere, in caves and are of the nature of middens. The characteristic shell is the *Trochus*; the *Littorina* of late Palaeolithic deposits is absent and the mussel, so frequent in Neolithic stations, is rare. The Culture has been recognised in Asturias, Cantabria, Catalonia and at Biarritz. There is also slight evidence for its having occurred elsewhere further north in France.

As regards the Art, a decorated cave has been discovered in the department of the Lot in the valley of the Célé, not far from Cahors. It is interesting to have a new area opened up. Not very far from St Girons some more clay modelled figures have been found as well as engravings on the walls

in the cave of Montespan. The clay models are not as good as the bisons at the Tuc d'Audoubert, but a feline and a bear have been recognised. A decorated cave, called Bassondo, has been found near Bilbao on the San Sebastian side, and another has now to be added to the group around Tarascon-en-Ariège. There have also been some further finds of no special importance in Asturias. The final publication on the Trois Frères cave (see p. 257) is still awaited. It is one of the most important finds from the point of view of prehistoric art that we have. Not only are the engravings extremely numerous and fine, but the position of the "Sorcerer" dominating the situation beside the natural pulpit (where no doubt the actual artist-medicine-man-priest performed) is of capital importance. This *ensemble*, in conjunction with the fact that similar phases develop simultaneously in widely different areas, suggests strongly the existence at this early time of a definite artist-medicine-man-priest caste having certain intercourse with each other over wide areas and seemingly schools of tradition for the art. As regards the meaning of the Art the magic significance is increasingly clear. Any student visiting the decorated caves—by the way never used and not suitable for actual homes—will agree that the superposition of styles (or of drawings in the same style), the queer signs—mutilated hands, etc.—the occurrence of the drawings often in obscure corners, difficult of access, can hardly be explained by the decoration or "desire for expression" theories. But when magic is claimed as the solution this requires further explanation, and here the psychologist has to be called in to help. No doubt, as with modern primitive peoples, suppressed desire induced representation of the thing desired; in the case of certain prehistoric folk this took the form of pictorial representation, in the case of certain modern so-called savages of mimetic dances. With a hunting people the play acting, no doubt by inducing confidence, is really efficacious in the chase.

In the domain of the *Art mobilier* or "Home Art" a new steatopygous statuette in ivory of a woman has been found in an early Aurignacian deposit at the cave of Rideaux near Lespugue (Haute-Garonne). The main interest of the figure

lies in the fact that the breasts are carved very low down towards the region of the stomach. Other finds—Limeuil (Upper Magd.), etc.—have been made but these only confirm what we know already. Among the animals figured in prehistoric art must now be included: *Cervus dama* (at the cave of Buxu, Asturias); the wild ass (at the cave of the Trois Frères, Ariège); the hare (at the cave of Isturitz, Basses-Pyrénées).

To explain the existence of the "Home Art" various suggestions besides magic have been put forward. Thus schools for the cave artists, sketches from nature, ornaments pure and simple have been suggested. Probably most of these suggestions are true; the problem of the "Home Art" is different from that of the caves and there is no reason why it should all have been made for one purpose. A very plausible suggestion has been made that some, at any rate, of the *Bâtons de commandement* were used to render thongs of hide flexible. Eskimos use such a tool which, after the thong has been threaded through the hole, is given a twist and moved up and down with a stropping motion, the thong being held taut.

Finally I have to thank the Press and Public for dealing so kindly with my book. Any criticism that has been made has been both friendly and useful and the results have been incorporated in this edition. I stick to my title, however, as it is intentional to exclude the Bronze and Iron Ages for the most part from the realm of true Prehistory. It is, of course, convention but it seems to me that Protohistory is a much more suitable term to use for those Cultures the interest in which is never geological and which occur in the twilight at the dawn of European history.

To the many kind friends who helped in the preparation of this second edition I offer my warmest thanks. Especially I would like to thank Dr Marr and Dr Haddon, who both made valuable suggestions, and Miss Parry, who spent much time and energy in its compilation.

M. C. B.

CAMBRIDGE,
June 1924.

PREFACE I

(TO THE FIRST EDITION)

A TEXT-BOOK on Prehistoric Archaeology is by no means an easy thing to write, and the matter is still further complicated to-day by the tremendous rise in the expense of publication, especially if many plates are figured. Again, in a subject such as Prehistory, so closely connected with various branches of written History, Geology, Ethnology, and Later Archaeology, it is very difficult to know when to be ultra-elementary, and when to assume a slight general knowledge of one of these allied subjects. Thus, in the chapters which deal with purely geological problems, a student of Geology wishing to learn something of Prehistory will find some of the most elementary geological ideas explained at length, as all are not geologists.

This book must be regarded as an attempt to give a general idea of the subject, and if the student arms himself with that excellent and inexpensive book by S. Reinach, *Répertoire de l'Art quaternaire*, he will have sketches of most of the Palaeolithic drawings. Questions of human anatomy have been but slightly dealt with, as that is really a separate subject requiring in the student an altogether special knowledge.

It has been my fortunate lot to be able to take part in several important diggings and to study nearly all the painted caves, etc. on the spot. For this purpose I have wandered over Spain, on donkey back and otherwise, and have also visited Scandinavia and North Russia. Prehistory is a subject which in great part has to be studied in the field, and especially is this true in respect to the problems of Prehistoric Art. No illustrations and no amount of description really equal a visit to at least one painted cave. If a serious student really wants to get into the atmosphere of these magic temples he must sooner or later make up his mind to visit at least one of the groups. Also, a short time at some of the diggings in Dordogne or in the Pyrenees will teach the student more than months of book-work. Here in England we are excellently situated for the elucidation of many of the geological problems—Man's relation to the Ice Age and the like—but,

as far as we know, we have little or no Art in our caves and indeed after Acheulean times the climate never was favourable for any flourishing cultures until Neolithic times. This does not mean that there is not plenty for us to do in England, but for the student, in process of learning his subject, there is no place like France or North Spain, as regards the Archaeology of the Stone Ages in Western Europe.

In 1914 I had completed in manuscript a short popular text-book guide to Prehistoric Art, intended for a shilling edition. The war destroyed this plan, and I have preferred to incorporate what I had written into this bigger work. For the former little book Professor Breuil very kindly wrote a short preface which he has further amplified for this present work.

ACKNOWLEDGMENTS.

I have especially to thank the Abbé Henri Breuil, Professor of Human Palaeontology of Paris, D.Litt. of Cambridge, my kind instructor and friend. In his company I have studied the caves in France, and wandered over the mountains of Spain; and it cannot be too much emphasized that any knowledge of Archaeology in Palaeolithic times which I possess is due directly and entirely to relationship with Professor Breuil. Special references to Professor Breuil's work are made here and there in the text, but practically all my knowledge of the subject is due to many discussions and conversations which I have enjoyed while digging together or while exploring the decorated caves and rock shelters of Spain and South France.

I have further to acknowledge a great debt of gratitude to Dr Hugo Obermaier, who until the war was also Professor at the Institute of Human Palaeontology at Paris. Under Dr Obermaier's care I was initiated into the scientific exploration of deposits; the whole of one season and part of another I spent at Castillo, where, besides the work in hand, much archaeological and geological information was gleaned in the course of conversations.

Besides my actual teachers I would like to take the opportunity of thanking, for all their kindness to me, M. Émile Cartailhac of Toulouse, M. Peyrony of Les Eyzies, M. Daleau

of Bourg-sur-Gironde, and last but not least M. Gaston Lalanne of Bordeaux. It was whilst arranging the latter's magnificent collection of implements from Laussel, under the direction of M. Breuil, that I learnt typology of implements.

I also wish to remember the kindness shown by M. Boule, Director of the Museum of Palaeontology, and head of the Institute of Human Palaeontology at Paris. Where official permissions were necessary, M. Boule has always most graciously accorded them, and one cannot be privileged to hear his conversation without gaining much from the lucidity and brilliance of his mind. In Scandinavia and North Russia, Dr Hallström of the National Museum of Stockholm was unwearied in his kindness in showing me some of the archaeological treasures in his area. In England I gratefully remember the late Professor Hughes of Cambridge and, although his ideas were in opposition to most of the modern ones, it was he who first inspired me with an interest in this branch of thought.

Dr Haddon has continually given excellent advice on matters more particularly relating to the ethnological side; and Dr Marr has been a continual stimulus in matters relating to geology. Much of the chapter dealing with Man in relation to geology is due to conversations with him, and many problems of Man and his relationship to the glaciations in Britain will probably be solved by the work which Dr Marr and a little band of helpers are engaged on in the study of the Pleistocene deposits in Cambridgeshire.

I also wish to express gratitude to Professor Macalister of Dublin, who most kindly entertained Professor Breuil and myself and accompanied us round the engraved monuments of Ireland, a most interesting journey.

Mr Reid Moir has more than once taken me to see his various finds in East Anglia. Although I started with antagonistic views, Mr Reid Moir has taken the trouble to explain his theories with great care, many of which seem now to be true beyond dispute.

For the actual writing of the book I tender my most profound thanks to my secretary, Miss M. Boyle. It is certainly true to say that without her skilful co-operation the

book would probably never have been written; not only was I relieved of the merely mechanical work, but further, the substance dictated was altered and put into a more readable form, and references have been verified. My grateful thanks are also due to Mrs Quiggin who has both indexed the book and given most useful criticism in correcting the proofs.

Very many thanks are also given to Sir Montagu Pollock, author of *Light and Water*, who has most kindly reproduced the various works of Palaeolithic art from my collection which are here figured. The other reproductions are the work of Mr L. S. Stanley of Clare College, who has expended on them a great deal of care and skill.

As regards the literature of the subject, H. Breuil's numerous papers in various scientific journals, as well as his publications in the Prince of Monaco's series, are of outstanding importance. H. Obermaier's latest book in Spanish, *El Hombre Fósil* (Madrid), is by far the best book written on Palaeolithic Prehistory as yet. His earlier book in German, *Der Mensch aller Zeiten*, is also excellent. *Ancient Hunters* by W. J. Sollas is an excellent introduction to the study of the subject, and especially deals with modern races equivalent to the prehistoric ones. *Men of the Old Stone Age*, by H. F. Osborn, is exceedingly useful, especially on the subject of human skeletons. Those who are interested in Man as a fossil, and who have no very great knowledge of human anatomy, may well consult the lucid and accurate accounts given in those parts of the volume that deal with physical anthropology. Déchelette's Manual (vol. I.) is still a mine of information, but is getting a trifle out of date.

Besides these books there are, of course, numerous articles on particular localities or special branches of the subject, mainly in French reviews.

The writer feels that a text-book on this Old Stone Age period may be useful for the help of students, though the time has not come for a final exhaustive work, the subject having been too little co-ordinated as yet (even in Western Europe) for a comprehensive and well-dated review of all the finds to be made. There is also a large mass of unpublished material, to ignore which gives an incomplete view of the whole. Obviously I have not been at liberty to make

any extensive use of unpublished material, though I have copies of much of Breuil's work which has not yet appeared in print; if this has been done by inadvertence at any point, I can only tender my humble apologies.

In conclusion may I be allowed to answer a few obvious criticisms in advance? As regards my use of the words Civilisation, Culture and Industry I should like to explain that I have tried to keep the first for the most general thing, i.e. the Neolithic civilisation or the civilisation of Europe. By Culture I mean a more local thing, i.e. the Solutrean culture or the cultures of the Swiss Lakes. Industry is the most localised, i.e. the industries at St Acheul or the Audi industry. It is not easy, however, to be always quite consistent. As regards the omission of terms sometimes in use in the British schools I can only plead that my training and work has all been abroad in the Continental schools. Then of course the inefficiency of the Neolithic and Bronze Ages chapter may be urged. Here, however, I can only say that the book is meant mainly for students of the Palaeolithic Ages and the chapter in question was inserted to link up the story of these ages with Historical times. The Neolithic and Bronze Ages require a long volume to themselves. As regards the descriptions of tools, etc. I will merely say that to describe a chipped flint is not as easy as it seems; not at all as simple as I had thought.

M. C. BURKITT.

March, 1921.

PREFACE II

(TO THE FIRST EDITION)

Mon cher ami Burkitt,

En vous accordant bien volontiers cette préface que vous sollicitez de moi, au risque de porter atteint aux privilèges qu'en cette matière confère un front chenu et l'âge académique, je cède au charme des souvenirs déjà nombreux que ce lien éveille pour nous. C'est notre première rencontre, sous le toit hospitalier du Professeur Haddon, après mes conférences sur l'art préhistorique à l'Université de Londres (1913), quand vous m'exprimiez votre souhait de suivre mes recherches sur le terrain et celles de mon collègue H. Obermaier, et tout l'intérêt que surcitaient pour vous ces questions encore neuves et peu connues de l'évolution intellectuelle de l'humanité primitive. Et bientôt, vous descendiez dans les profondes mais pacifiques tranchées de la grotte de Castillo, où M. H. Obermaier vous initiait aux fouilles méthodiques.

Les grottes ornées des Cantabres recevaient successivement en Juin et Juillet votre visite, et moi-même, en vous y guidant, avais l'intime satisfaction de remarquer à vos questions bien posées, que non seulement vous aviez admirablement saisi mes idées exposées dans les publications des cavernes ornées, mais que certaines imprécisions voulues, certaines obscurités à peine signalées, ne vous avaient point échappé. C'est pour l'auteur de livres aussi spéciaux, dont plusieurs parties se défendent par leur aridité même, une grande satisfaction de se voir aussi bien lu et pénétré. Octobre vous ramena à mes fouilles boueuses de Gargas, et les loisirs des soirées d'automne, comme les repos forcés durant les travaux, étaient occupés par de longues conversations; puis nous fîmes l'inoubliable circuit des grottes ornées pyrénéennes...

Enfin vint l'expédition d'hiver en Andalousie, en Janvier 1914, les longues chevauchées à travers les âpres collines griseuses à demi-couvertes de chênes liéges, de la province de Cadix, où s'élèvent les grandes masses calcaires, dressées en pyramides écrasantes de la Sierra de Libar ou de Maria; les

traversées de torrents secs ou débordés, les campements de fortune sous de misérables huttes, au foyer primitif, telles que devaient en construire les néolithiques dont nous relevions les peintures. Et combien de choses encore, depuis la visite des contrebandiers à la "choza," jusqu'aux relâches si appréciables de la "caserta" du Colonel Verner à Tapatanilla, jusqu'aux vastes horizons depuis Benaojan vers Ronda, ou depuis Higueruela (Albacete) sur les montagnes lointaines de Velez Blanco et jusqu'aux cimes de la Sierra Nevada; les propylées de l'antre infernal que forme la porte du ruisseau de Montejaque et cet autre gouffre de la Pileta, dont nous avons ensemble reviolé les arcanes.

Figuras, Palomas, Pileta, los Letreros, Alpera, que de perspectives, anciennes aussi, que nous avons remués, sur la vie des humanités éteintes, dont on se sent moins séparés, non seulement par le contact journalier de leurs peintures et de leurs abris, mais à celui de ces natures primitives, de la vie rude et simple des pâtres et des paysans!

Et d'Espagne, nos esprits s'élevaient et s'envolaient bien loin, vers d'autres faits humains, qu'il serait bon de comparer à ceux que nous avions sur les yeux; la Scandinavie, la Sibérie, d'un côté, l'Afrique, l'Australie, l'Amérique...

Et vous me disiez combien un petit livre serait utile pour révéler ces passionnantes données, soit aux débutants, soit aux touristes instruits et curieux, avides de mener quelques semaines, avec un but intéressant, la vie libre, accidentée, pleine de couleur et l'imprévu, que l'on peut encore trouver au cœur de l'Espagne.

J'en convenais, mais je vous confessais mes scrupules d'enlever aux recherches sur le terrain et à leur mise-en-œuvre immédiate, le temps si bref de ces années de vie où la vigueur du corps sert docilement les enthousiasmes de l'âme et les ardeurs de l'esprit. Vous m'exprimâtes alors votre première pensée que peut-être vous pourriez faire ce livre, et j'y applaudis bien volontiers, heureux qu'aimant assez, vous-même, les études qui me sont si chères vous vous donniez à tâche, avec votre esprit net et méthodique, de leur donner d'autres fervents, et à prêcher "ce que vos yeux ont vu, ce que vos mains ont touché."

Après les longues années de guerre, vous revenez à votre

projet; mais vous l'avez transformé; chargé depuis peu d'enseigner la préhistoire aux étudiants de l'Université de Cambridge, vous avez commencé à dérouler systématiquement devant leurs yeux les découvertes réalisées sur l'aspect et le genre de vie de nos premiers aïeux, les hypothèses qu'elles suggèrent pour expliquer les faits; vous avez entraîné leurs yeux à discerner les perspectives profondes à travers lesquelles les pensées et les usages des temps nouveaux se sont élaborés à travers mille essais divergents, des origines, encore si ténébreuses, où l'intelligence se manifeste par la pierre éclatée et la flamme entretenue au foyer, jusqu'à l'éclosion surprenante du grand art des chasseurs de Rennes et de Bisons, jusqu'à l'apparition des demicivilisés néolithiques, envahissant l'Europe, pour y labourer la terre, ensemencer des champs, y paître leurs troupeaux, y construire des bourgades et des camps retranchés; vous avez promené la pensée de vos élèves; vous avez voulu fixer cet enseignement dans un livre qui dépasse leur cercle, provoquer des enthousiasmes et suggérer des recherches. Puisse-t-il, feuilleté par des curieux des deux hémispheres, y promouvoir des vocations de chercheurs attentifs, et nous valoir bientôt sur tous les points de l'immense empire Britannique, une judicieuse récolte de faits nouveaux qui éclaire d'une plus large lumière tous les problèmes si passionnants mais encore à peine formulés, des origines de notre espèce et des stades par lesquels elle est passée durant les migrations tant de dizaines de fois millénaires.

H. BREUIL.

10 *Juin*, 1920.

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GLOSSARY OF TERMS

English	French	German	Spanish
Arrow straightener *or* sceptre	Bâton de commandement	Kommandostab	Bastón perforado
Awl	Perçoir	Bohrer	Perforador
Blade	Lame	Klinge	Hoja
Blade with blunted edge	Lame à tranchant rabattu	Klinge mit abgestumpftem rücken	Hoja de dorso rebajado
Bulb of percussion	Bulbe de percussion	Schlagbeule	Bulbo de percusión
Burnt flint	Silex craquelé	Krakeliert	Cuarteado
Core	Nucleus	Nukleus	Núcleo
Coup-de-poing	Coup-de-poing	Faustkeil	Hacha de mano
Disc	Disque	Diskus	Disco
Fabricator	Retouchoir	Schlagstein	Retocador
Fish-hook	Hameçon		
Flake	Éclat	Abschlag	Lasca
Flake face	Plan d'éclatement	Abschlagsfläche	Plano del lascado
Flint	Silex	Kiesel	Silice
Graver	Burin	Stichel	Buril
angle graver	burin d'angle		
beaked graver	burin busqué	bogenstichel	buril de punta arqueada
double-polyhedric graver	burin prismatique	prismatischer stichel	buril prismático
ordinary graver	bec de flûte *or* ordinaire		
parrot beak graver	bec de perroquet	papageienschnabel	pico de loro
plane *or* flat-faced graver	burin plan		
single-blow graver	burin d'un seul coup		
single-polyhedric graver	burin polyédrique		
Hammer-stone	Percuteur	Schlagstein	Percutor
Harpoon	Harpon	Harpune	Arpón
Levallois-flake	Éclat levallois	Levallois-abschlag	Lasca tipo levallois
Needle (eyed)	Aiguille à chas	Nadel	Aguja
Nodule	Rognon	Knollen	Nódulo
Notches *or* indented tools	Encoche	Nutskerbe	Escotadura
Patina	Patine	Lach	Pátina
Pigmy tools	Microlithes	Mikrolithen	Microlitos
Point	Pointe	Spitze	Punta
Audi point	pointe d'Audi		
Châtelperron point	pointe de Châtelperron		

English	French	German	Spanish
Font-Robert point *or* Aurignacian double-shouldered point	pointe de Font-Robert	stielspitze vom Font-Robert typus	punta pedunculada de la Font-Robert
forked bone point	pointe à base fourchue	speerspitze mit gespaltener basis	punta de base ahorquillada
Gravette point	pointe de la Gravette	Gravette spitze	punta de la Gravette
lance points (bone)	sagaie	speerspitze	azagaya
laurel-leaf javelin point	feuille de laurier	lorbeerblattspitze	punta hoja de laurel
Mousterian point	pointe mousterienne	moustierspitze	punta musteriense
single-shouldered point	pointe à cran	kerbspitze	punta de muesca
split base bone point	pointe en os à base fendue	aurignacienspitze	punta aurinaciense de base hendida
willow-leaf javelin point	feuille de saule	rautenblattspitze	hoja de sauce
Polisher	Lissoir	Glätter	Alisador
Scraper	Grattoir	Kratzer	Raspador
core scraper	grattoir nucléiforme	konischer kratzer	raspador cónico
end scraper	grattoir sur bout de lame	klinge mit kratzerende	hoja raspador
keeled scraper	grattoir caréné *or* grattoir tarté	kielkratzer	raspador aquillado
round scraper	grattoir rond	rundkratzer	disquito raspador
side scraper	racloir	schaber	raedera
Stiletto	Poinçon	Pfriem	Punzón
Striking platform	Plan de frappe	Schlagfläche	Plano de percusión
Throwing-stick	Propulseur	Wurfstab	Propulsor
Toothed blade	Lame dentelée	Gekerbte klinge	Hoja dentada
Trimming	Retouche	Retusche	Retoque
Utilised bone	Os utilisé	Zugespitzer knocken	Hueso aguzado
Wand	Baguette	Stäbchen	Varilla

MAP OF WESTERN EUROPE

SHOWING THE POSITION OF THE MORE IMPORTANT LOCALITIES CITED

(Localities numbered the same are only a few miles apart as the crow flies.)

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Alpera 35
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Amiens district . . . 9
Arudy 25

Barranco de Valltorta . . 33
Batuecas 41
Bouchiéta. 21
Brassempouy 27

Cantos de la Visera . . . 35
Cap Blanc 15
Carnac 46
Castillo 30
Chancelade 14
Chapelle-aux-Saints . . . 16
Châtelperron 10
Chelles . . . near Paris
Clonfinlough 45
Cogul 32
Colombière 19
Combarelles 15
Combe-Capelle . . . 15
Cotencher 47
Covalanas 29
Cresswell Crags . . . 2

El Pendo 30

Ferrassie (La) 15
Font-de-Gaume . . . 15

Gargas 24
Gorge d'Enfer 15
Gourdan 24
Grèze (La) 15

Hornos de la Peña . . . 30

Ipswich district . . . 3

Kent's Cavern 7
Knockmany 43

Las Figuras 38
Laugerie Basse. . . . 15
Laugerie Haute . . . 15
Laussel 15
Les Eyzies 15
Lorthet 25

Madeleine (La) . . . 15
Marsoulas 23
Mas d'Azil 22
Mauer Sands 48
Mentone 20
Minateda 40
Moustier (Le) 15
Mouthe (La) 15

New Grange 44
Niaux 21

Oldcastle 42

Pair Non Pair 26
Pasiega (La) 30
Paviland 6
Peña Tú 31
Pileta (La) 37
Piltdown 5
Pindal 31
Placard (Le) 13
Portel (Le) 21

Quina (La) 11

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Sordes 28
Spy 8
St Acheul 9

Teyjat 12
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Trilobite 17
Trois Frères 23
Tuc d'Audoubert . . . 23

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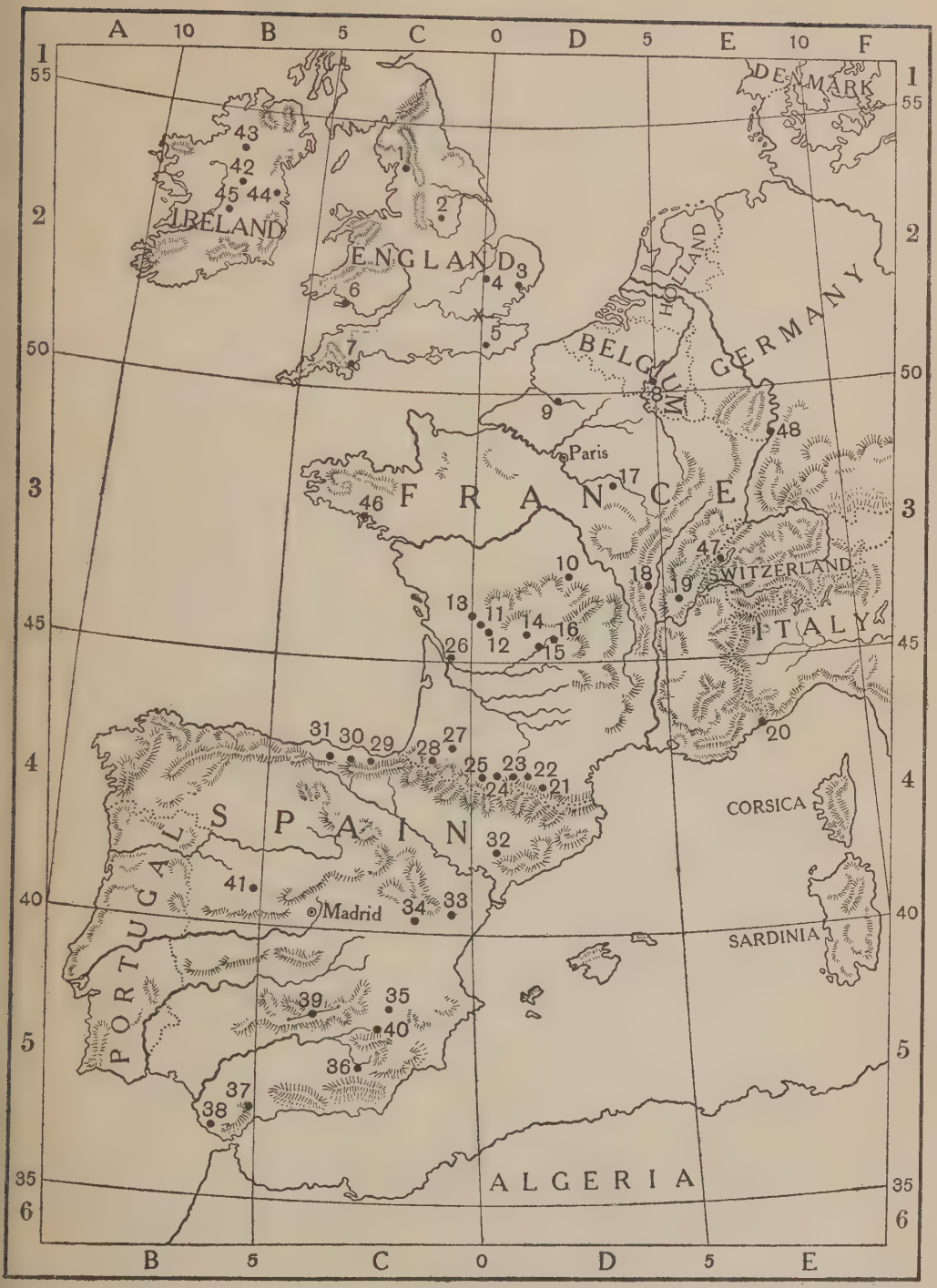
Velez Blanco and district . 36
Victoria Cave (Yorkshire) . 1


A 10 B 5 C 0 D 5 E 10 F
1 55
2
50
3
45
4
40
5
35
6
B 5 C 0 D 5 E
DENMARK
IRELAND
ENGLAND
HOLLAND
BELGIUM
GERMANY
Paris
FRANCE
SWITZERLAND
ITALY
CORSICA
SARDINIA
SPAIN
PORTUGAL
Madrid
ALGERIA
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

ARCHAEOLOGICAL DIVISIONS

STEEL (=Carbonised iron)

		Modern	
IRON	La Tène	IV. = Early Roman Empire age	
		III. = (Commencing *circa*)	150 B.C.
		II. = „	250 B.C.
		I. = „	400 B.C.
	Halstatt	II. = „	600 B.C.
		I. = „	800 B.C.

		England	France, etc.	
BRONZE COPPER	Several periods (e.g.)	Hoard finds with swords, etc.	V.*	Periods
			IV.	
		Flanged celts and daggers	III.	
		Barrows	II.	
			I.	

			Western Europe	Succession found possible in Scandinavia	
STONE	Neolithic	*Carnac*	Stone cist Allée couverte Dolmen	Stone blades and canoe shaped axes Flat-sided square-edged celts Curved-sided, narrow-necked square-edged celts	
		Robenhausen	Polished curved-sided celt		
		Campignian	Danish Kitchen Midden, etc.		
	Palaeolithic	*Azilian*	Maglemose Tardenoisean Upper Lower	Glacial Succession	 Daun
		Magdalenian	VI. V. IV. Types of Art "mobilier" and evolution of harpoons		Gschnitz
			III. II. I. Evolution of lance points		Bühl
		Solutrean	Upper (shouldered point S.W. of Loire) Middle (laurel-leaf) Proto. (Aur. chip with trace of Sol. chip)		
		Aurignacian	Upper "Gravette" point Middle "beaked" burin Lower Châtelperron point Transition Audi point		Achen
		Mousterian	Late Early		Würm
		Acheulean	Late Early		Early Würm
		Chellean	Late Early		Riss Würm
		Pre-Chellean			Riss Mindel Riss

* Not separated from IV by M. Déchelette.

PREHISTORY

CHAPTER I

INTRODUCTION

THIS book is concerned with the study of Prehistoric Archaeology, called Prehistory, and attempts to discuss the various human civilisations of mankind in Europe and the north coast of Africa during those early periods before historical record was invented. The subject is partly new and partly covers areas which for want of a more exact classification have been tacked on to other allied subjects. In such a study we must of necessity expect to be perpetually coming in contact with other lines of thought, for Prehistoric Archaeology can be grouped under the headings both of Science and of History. It is in fact unique in being a branch both of Science and of History. Of course there are elements of History, or rather of historical succession, in the science of Geology and in many of the other sciences, but in no other subject do the two lines of thought meet on such equal terms. It is in fact difficult to know how exactly to class Prehistory from the point of view of a teaching faculty. On the one hand it would be better to include the Stone Ages under Geology (Science), and the Bronze and Iron Ages under History, but as it is impossible to draw any hard and fast line between these archaeological ages, we have to admit that our subject is on the border-line, and it is none the less interesting for being so. On the one hand we make continual use of geological methods, such as the law of succession, etc., and concern ourselves with the relation of Man to the Ice Age and to Geology generally. On the other hand, the obvious connection between the history of modern primitive peoples, and our early civilisations, tends to link our study with that of Ethnology. Briefly, our subject is the link between certain branches of Natural Science and History.

It may be useful before examining our subject in detail to try in this Introduction to give:—

1. A bird's-eye view of Prehistory: the subject of our study.

2. A sketch of its relationship to allied subjects.

3. A brief outline of the history of the study from the time of the discovery of the first object recognised as a stone implement, which took place in London about 1690, to our own day, when the brilliant work of such men as MM. Boule, Breuil, Capitan, Cartailhac, Commont, Gaston Lalanne, Obermaier, Albrecht Penck, Peyrony, Schmidt of Tübingen, etc., has opened new and fascinating lines of research undreamt of by their predecessors.

1. PREHISTORY.

We shall consider Prehistory under four main heads:

A. Man's civilisations and life from the time he became human to the time of written records.

B. The various conditions, climatic and otherwise, under which Man lived during this period.

C. The evolution of Man as a living organism.

This will not be treated of very deeply in the following pages, and the student is referred to books specially dealing with early physical anthropology.

D. The development of prehistoric races in different parts of the world and their relations one to another.

A. *Man's civilisations and life from the time he became human to the time of written records.*

For convenience sake the history of Early Man is divided into three periods:

1. Stone Age. 2. Bronze Age. 3. Iron Age.

Naturally these three periods by no means occupy the same length of time, and each of them is divisible into a series of sub-periods which will have to be considered in a later chapter.

A grave note of warning may be given here. The student should be careful to distinguish between Cultural and Time Ages. Though the above threefold division holds good as a

rule for both the Cultural and Time Ages, these two do not always coincide in different parts of the world. At a time when some people had already learnt the use of Iron, others were only able to employ Bronze, and yet others only Stone. There was no fixed moment when any one race ceased to use Stone and learnt the use of Bronze. The change of material would be due to several causes, such as the actual immigration of a foreign Bronze-using people, or the influence of their knowledge introduced by primitive commerce. Also, even if Man knew how to smelt copper ores, the use of metal would depend on the presence of suitable local ore.

Bronze was used in South Spain before it was used in North France, and the Scandinavian late Neolithic folk of Bronze Age times became very skilful in copying Bronze tools in Stone, there being a lack of suitable ores in the country to make metal implements common.

Sometimes, as in the case of the Fijians, the Bronze Culture is absent. When Baron A. von Hügel went to Fiji the people at a certain place were culturally in the polished Stone Age; before he visited the same place less than two years later commerce had introduced the use of Iron. There was no Bronze Age, and therefore, culturally, the succession is an abnormal one: for in normal succession the discovery of easily smelted copper and the use of a copper-tin alloy (Bronze) precede the use of the more refractory Iron. Now that Man travels widely, discoveries in one place tend to be conveyed by commerce rapidly to all parts of the globe. The order of evolution in Fiji is correct, though the middle number of the series is absent. Again it is important to note that a certain portion, say *B* 1, of a civilisation *B* may migrate into new lands, and that either the migrated portion *B* 1 or the parent *B* may develop further while the other part remains stationary or even develops differently. At the end of a given period we find two closely connected peoples of the same age in time, but of different ages culturally.

We shall be concerned with the Metal Ages only in a chapter containing a few preliminary notes to their study. This is because the art of Historical Record had already been learnt, and was beginning to be practised at certain centres in Bronze and Iron Age times. It is true there is no written

historical record in such countries as Great Britain or Scandinavia till a very much later date, but in the Nile and Euphrates valleys we get a fairly complete account of the developments in the civilisation; and occasionally too the veil is lifted over the more backward Europe, when some trader records his adventures on returning to the more enlightened centres just mentioned. Even in Greece we get a record carrying us back to 1000 B.C., which was near the beginning of the Iron Age, and when the Cretan script is read who knows what may not be brought to light?

The Neolithic or New Stone Age, though truly prehistoric, is a separate branch of the subject, and will be treated as such. The Neolithic folk were not unlike ourselves, living under conditions of climate similar to those of to-day. They lived in villages, which, in some parts of the world, are found built on piles in lakes for safety's sake; they practised Agriculture and the Domestication of Animals. They often polished their stone axes, making them sometimes, for agricultural purposes, of a tough material other than flint. These polished stone axes might even be used for the felling of trees. The time during which these people were ignorant of the use of metal was probably short, although as has been said its use for tools in any district would be largely determined by the presence or absence of suitable ores. Neolithic Man practised the use of Pottery, although the potter's wheel was not discovered till a much later date.

Very different were the civilisations of the Palaeolithic or Old Stone Age with which we shall have mostly to deal. Here we have a hunting people who knew nothing of Metal and merely chipped their tools, not even having learnt to get an edge by polishing. No true pottery of this Age has ever been found. Agriculture was unknown, and there were no domestic animals. No traces of dog's bones occur in the deposits until the very end of this era and without dogs Man cannot have flocks and herds. Our hunting folk lived on the sunny side of valleys, and under overhanging rocks, and for food they hunted the game which at certain periods abounded in the valleys below. They dressed no doubt in the skins of the animals killed, and this may well be the explanation of the number of bones of Cave Bear found.

The flesh was good, but above all the skin was valuable. No needles are found till late Upper Palaeolithic (Magdalenian) times. It is therefore probable that large skins were used, such as that of the bear, since the sewing together of small skins to make a garment would be a work of some difficulty. The use of Fire seems to have been known from the earliest times, since there is evidence of its use at Taubach and other very early stations.

Palaeolithic Man painted and engraved pictures of game in the caves with, as we shall see, a magic intent, in the hope of thus being aided in hunting. These people must of necessity have been few in numbers, for a country does not support a large hunting population. The hypothesis of Malthus was as true for them as it is for us to-day; they bred to the starvation limit, and in a hunting people this limit is soon reached. It is only by the practice of Agriculture and the Domestication of Animals that the number of humans able to live on a square mile is increased. It may be questioned if the whole of France, even in flourishing Upper Palaeolithic times, supported a population of more than a few hundred thousand souls. They formed more or less isolated groups, and tended to live on the land that separated the mountain from the plain. There was probably but little steady intercourse between the people of the different groups. In Upper Palaeolithic times, however, when Art was practised there must have been a certain intercourse among the men of the artist (medicine man) caste, i.e. the men who worked the painted magic in the caves. The proof of this is the similarity in the changes of style in the Cave Art of widely separated regions. This would suggest a single sorcerer caste, or at any rate widespread schools of tradition. If the Art had undergone no evolution and had merely presented a similar style in the various regions, one might have argued for a common origin only; but similar changes, a similar evolution and a similar succession in style (occurring beside special local types), in such widely separated regions as the Dordogne, Pyrenees, and Cantabria, seem to show that there was at least some intercourse among the artists. When we excavate their hearths under the overhanging rocks, we find a succession of different industries in

Stone and Bone, and the lower deposits are obviously older than the upper ones. In certain layers, corresponding in age to Upper Palaeolithic times, and associated with the particular Stone and Bone implements peculiar to the period, we find engravings, bas-reliefs, or sculptures, sometimes even paintings on stone or on fragments of bone of some animal which had been eaten, and the remains of which had been left to rot on the cave floor. Occasionally it is the bone weapons themselves which are decorated. This manifestation of art from the deposits of the Upper Palaeolithic age (called "Art mobilier") has a considerably wider area of distribution than the Cave Art we have just mentioned, and examples of it are found from North Spain to the Ukraine.

It will be our task to trace all these civilisations from the moment that Man was first developed from the animal, through early Palaeolithic times when, though he practised no art, he had a real civilisation, knew about fire, and left such definite remains as chipped stone implements, and the bones of animals which he had eaten; on through the age of the artists in Upper Palaeolithic times, to the Neolithic era, when the New Stone Age people seem first to have practised communal life on a large scale. Finally, at the approach of the Metal Ages we shall be able to link up our story with the earliest historical records.

B. *Conditions, climatic and otherwise, under which Man lived during this period.*

One of the best methods of ascertaining the climatic conditions under which Man lived is to examine the contemporary fauna. In South France, when we find the bones of mammoth and reindeer in Man's home, or their pictures, drawn by Man, on the cave walls near by, we may be certain that at that particular period a cold climate existed in that region. Similarly, the occurrence of bones of African animals such as the hippopotamus, etc., indicates an oscillation of climate, the temperature being higher than it is to-day. The changes of fauna do not, however, constitute a very delicate thermometer. Once a warm fauna is installed it is slow to migrate south when a cold period comes, and vice versa. It often exists for some time along with the cold fauna, which

has arrived from the north. Especially is this the case with Carnivora, as they do not directly depend on vegetation, which is subject to entire alteration with a change of temperature or moisture.

Sometimes it is possible to determine the climate from the nature of the deposit. For example, an industry called Acheulean, of Lower Palaeolithic age, is found in a deposit of loess at Amiens. Loess was laid down under "steppe" conditions, and we thus see that Acheulean Man roamed about North France when the climate was not unlike the climate of parts of Siberia to-day. Again, at the cave of Cotencher in the canton of Neufchâtel, there is a deposit containing another civilisation called Mousterian. This deposit is of glacial origin, and has been determined as being related to the last glacial phase. At that time then, the climatic conditions at Cotencher, in which Mousterian Man lived, must have resembled those under which the Eskimos live to-day.

C. *The evolution of Man as a living organism.*

This problem will only be touched upon (see chapter XIII) and the student is referred to books on early physical anthropology.

D. *The development of prehistoric races in different parts of the world and their relations one to another.*

It is obvious that the development even of early Stone Age civilisation was not necessarily uniform in all parts of the world, though owing to the lack of knowledge of certain fundamental arts such as Agriculture, etc., civilisations tended to be much more uniform than in Neolithic and later times. We have to deal with probably only two or three really different civilisations as compared with the multitude of local variations that confront us from Neolithic times. It is the task of the Prehistorian to examine the influence of these various developments on one another and, as far as the records permit, to trace the movements of these various peoples. Owing to the early records being, in the nature of things, comparatively meagre, the task is one of

great difficulty, and allows only too much scope for hypothesis and speculation not properly founded on scientifically proved facts.

2. THE RELATIONSHIP OF PREHISTORY TO ALLIED SUBJECTS.

We have next to discuss the subjects allied to Prehistory, and so to find the relationship of our subject to other lines of study. There are certainly three main and distinct subjects with which Prehistory is connected.

A. Geology.

B. Ethnology.

C. Human Anatomy, or more accurately Human Palaeontology.

A. *Geology*.

The relationship of Man to the geological sequence of events, especially the fact that he is found associated with the various glacial phenomena of the great Ice Age, is naturally of importance to the Geologist, and is a purely geological question. All our archaeological layers in the caves and elsewhere are of the nature of strata, and being so can be examined by ordinary geological methods. Thus for example, in a cave deposit the geological law of succession holds good which states that, if there is an undisturbed series of strata one upon the other, then the lowest stratum is older than the one above it, and so on. This is of course fundamental to the Prehistorian, as it enables him to determine the relative age of the various archaeological layers and their contents. The Geologist of to-day is beginning to utilise the humanly-made implements contained in a gravel bed as fossils, to help him to determine the age of the gravel. Especially in the earlier periods, Prehistory and Geology have to go hand in hand.

B. *Ethnology*.

In Upper Palaeolithic times there were flourishing industries in Bone and Stone, the former often decorated, and there was also an emblazoning of the walls in the recesses of

caves. This is of course of deep interest to those who study modern primitive peoples.

When such a thing as the mutilation of hands by the removal of some of the finger-joints is found not only among modern primitive peoples, but also amongst those of the Palaeolithic age, painted on the walls of a cave, it is obvious that the Prehistorian and the Ethnologist are dealing with more or less similar phenomena, and must unite in explaining the various problems arising in their own particular subjects. The Ethnologist will find the proof that certain of his problems (sympathetic magic and the like) are much older and even more fundamental than he could suppose from the study of modern primitive peoples alone; whilst the Prehistorian will often glean hints to explain his problems from analogy with modern primitive peoples. In this he must be very careful, always keeping in mind that similar physical conditions may produce somewhat similar civilisations, which may not have any true relationship one to the other.

C. *Human Anatomy, or Human Palaeontology.*

Human bones are occasionally found in deposits, and these are exceedingly interesting to the student of human biology and the development of Man's frame. Sometimes the skull is sufficiently well preserved to give us a cast which shows on it the actual convolutions of primitive Man's brain. The Biologist wishes to trace the development of Man from lemur-like animals at the base of the Tertiary geological period, along lines parallel to those of the development of the anthropoid apes; and the discovery of the skeletons of these primitive men supplies a fragmentary link here and there in the chain. Very few well-authenticated and well-dated skeletons have been found, and obviously nothing which is not absolutely sure should be accepted. Theories deduced from material found by labourers, and not absolutely authenticated or dated, are worse than useless. Already a sufficient number of skeletons has been found to demonstrate the existence of several races in Palaeolithic times, and a single steady evolution can now no longer be admitted.

As is the case with most things, when the study goes

deeper and when further discoveries are made, the subject is found to be more and more complex. It may be added that the questions of the migrations and movements of these Palaeolithic people are also of interest to the Biologist.

3. A BRIEF OUTLINE OF THE HISTORY OF THE SUBJECT[1].

1690 A pear-shaped tool, associated with an elephant's tooth, was found near Gray's Inn Lane, London. It is preserved in the British Museum and described as "a large black flint shaped into the figure of a spear's point" (No. 246 in the *Sloane Catalogue of the British Museum*).

1797 Mr J. Frere, F.R.S., discovered chipped flint implements at the village of Hoxne, in Suffolk. He was so much struck by the situation in which the implements were found that he wrote an account of his discovery, claiming that they belonged to "a very remote period, indeed, even beyond that of the present world."

1828 In this year Tournal demonstrated the association of Man with a Quaternary fauna in the grotto of Bize (Aude).

1833 Tournal's discovery was confirmed by the excavations of Schmerling in grottoes in the neighbourhood of Liège.

1834–45 Between these dates M. Brouillet discovered an engraved bone, believed at the time to be of Celtic age. This was found in the grotto of Chaffaud, at Sévigné (Vienne). It may be noted that this was the first Palaeolithic art to be discovered, and it was placed in the Musée Cluny, a collection now removed to St Germain.

1836 Christian Thomsen in Denmark suggested the sequence of the three successive ages of Stone, Bronze, and Iron.

1840 About this date Taillefer and Mayor discovered an engraved bone at Veyrier (Salève), and George Grey discovered caves decorated with drawings and paintings in North-western Australia.

1844 Aymard announced his discovery of human remains in the volcanic deposits of Denise (Haute Loire).

1847 Boucher de Perthes of Abbeville first published an account of the shaped flints collected by him in previous years in the alluvial deposits of the Somme. He claimed they were of deluge age, and was not believed.

1854 Ferdinand Keller noted the existence of lake dwellings at Meilen on the Lake of Zurich.

1855 Dr Rigollot of Amiens found tools similar to those found by Boucher de Perthes, ten feet and more below the surface at St Acheul. His statements were disbelieved.

[1] In the following pages the writer has borrowed largely from the Introduction to the brilliant little book of S. Reinach, *Répertoire de l'Art Quaternaire*; also from *La Préhistoire*, by G. and A. de Mortillet.

1856 Fuhlrott discovered the famous Neanderthal skull at the place of that name in Rhenish Prussia. His statements were not believed at the time.

1858 Hugh Falconer visited Abbeville and was convinced of the value of the discoveries.

1859 Prestwich and Evans visited Abbeville and Amiens. Evans found an implement 17 feet down. Prestwich read a paper on the subject before the Royal Society.

1860 Édouard Lartet discovered the engraving of the head of a bear on a broken stag's horn at Massat. Milne-Edwards dug in the cave of Espéluges at Lourdes.

1861 Édouard Lartet published a memoir of the grottoes of Massat and Sévigné, with two lithographs of engravings on bone, and a brochure on the sepulchral cave of Aurignac (Haute Garonne).

1862–3 Caraven pointed out to Lartet the station of Bruniquel (Grotte des Forges). Methodical research was begun there, also at Gorge d'Enfer, Les Eyzies, La Madeleine and Laugerie Basse; the latter being explored by the Marquis de Vibraye. *The Geological Evidences of the Antiquity of Man* by Charles Lyell, the first general work on the age of Man, was published in 1863.

1864 Lartet and Christy published their first joint article on the art of the Reindeer age.

1865 Christy died. The Marquis de Vibraye presented to the Académie des Sciences the head of a mammoth in reindeer horn, discovered at Laugerie Basse, and the engraving on a plaque of schist erroneously called "The Battle of the Reindeer."

1866 Eugène Trutat and Émile Cartailhac founded the first Museum of Human Palaeontology at Toulouse.

1867 Bourgeois propounded the question of Tertiary Man at the International Congress at Paris. The Museum at St Germain was inaugurated.

1868 A rock shelter containing skeletons of a type henceforth known as the Cro-Magnon race was discovered at Les Eyzies in the course of laying a railway. The collections of Christy and Lartet were divided between the British Museum and that of St Germain.

1869 At the International Congress of Anthropology at Copenhagen Worsaae declared that the engraved bone found at Chaffaud in 1840 was not Celtic but Quaternary. G. de Mortillet wrote his first classification of the Caves, a classification founded on the products of human industry.

1870 Rivière began the study of the Grimaldi caves at Mentone.

1871 Lartet died. Carlos Ribeiro announced from Otta, in Portugal, traces of stone culture of Miocene age. Piette began his excavations in the cave of Gourdan.

1872 Massenat discovered a human skeleton of the Magdalenian period at Laugerie Basse (Dordogne), and Rivière found skeletons at Grimaldi.

1873 Piette published his first work on the cave of Gourdan.

1874 Heim and Merk, digging at Kesslerloch, near Schaffhausen, discovered the engraved bone called "the Reindeer of Thaingen." The first painted pebbles were found at the cave of La Crouzade, near Narbonne. They passed without special notice. L. Lartet and Chaplain-Duparc found bear's teeth engraved with arrows in the cave of Duruthy at Sordes. The first recognition of Tectiforms by Cartailhac.

1874–77 Diggings were carried on at Victoria Cave, Settle, Yorkshire.

1875 Sautuola discovered the black paintings at the end of the cave of Altamira, near Santander. Piette affirmed that the Neolithic industry is joined to the Quaternary industry.

1876 Boyd Dawkins and Mello began to dig at Cresswell (Derbyshire).

1877 The discovery of worked flints, alleged to be of the Miocene age, at Puy-Courny, was announced. G. de Mortillet writing of the Cave Art says: "C'est l'enfance de l'art, ce n'est pas l'art de l'enfant."

1878 Chiron found drawings on the walls of the cave of Chabot.

1879 The daughter of Sautuola noticed pictures of animals on the ceiling of the cave of Altamira, and her father published an account of them in the following year. A. de Maret finished his methodical exploration of the cave of Placard (Charente), which furnishes very exact examples of the superpositions of Palaeolithic industries.

1880 Dubalen begins his work at Brassempouy.

1882 A. Lang claimed that savage art had a practical aim. He put forward a theory of the language of signs, and also spoke of a magic significance.

1884–5 Louis Julien, working on the cave of Barma-Grande, found about this date some feminine statuettes.

1886 The discovery at Spy (Belgium), by de Puydt and Lohest, of two human skeletons of the Mousterian epoch, removed the last doubts about the value of the Neanderthal remains. Piette discovered, at the Mas d'Azil, objects characteristic of the period which is henceforth called Azilian.

1887 Piette, writing to Cartailhac, stated that he considered the paintings of Altamira to be of Magdalenian age.

1888 Féaux and Hardy found, at Raymonden (Dordogne), the grave of a reindeer hunter containing a human skeleton of Magdalenian age.

1889 L. Chiron pointed out to the Anthropological Society of Lyons the engravings on the cave walls at Chabot. Harrison showed the Ightham eoliths which he had found to Prestwich and Evans. The former accepted them as humanly made, but Evans was unconvinced.

1892 A workman discovered, at Brassempouy, an ivory statuette, first called La Poire, afterwards discovered to be part of the figure of a woman.

1894 Various figurines were discovered at Brassempouy. Eugène Dubois described the remains collected at Trinil, in the island of Java, as belonging to a genus *Pithecanthropus erectus*, a being between the anthropoid ape and the lowest human races.

1895 Émile Rivière first recognised the existence of engravings and paintings of Palaeolithic age on the walls of the cave of La Mouthe, in Périgord. Lombard Dumas noticed the silhouette of a mammoth in the cave of Chabot. Piette linked the engravings of La Mouthe with the paintings, meanwhile forgotten, of Altamira.

1896 F. Daleau inspired by the discoveries at La Mouthe observed drawings of animals on the walls of the cave of Pair-non-Pair.

1897 Félix Regnault and Jammes discovered the paintings and engravings at Marsoulas.

1899 Rivière discovered a stone lamp at La Mouthe. Walter E. Roth drew attention to paintings in the caves at Chasm Island, in the Gulf of Carpentaria, Australia. S. Reinach wrote in the *Revue Archéologique* suggesting that perhaps the figures of animals so frequent in Cave Art might be connected with totemism.

1900 Breuil and Dubalen began digging at Sordes.

1901 Excavations were made by Breuil at the Mas d'Azil. Breuil, Capitan and Peyrony discovered and studied the engravings and paintings of Combarelles and Font-de-Gaume. The Abbé de Villeneuve discovered at Baoussé-Roussé (Mentone) the tomb called "of the Negroids."

1902 Breuil discovered the engravings of Mas d'Azil. Cartailhac discovered new paintings and engravings at Marsoulas, and studied them with Breuil. Volkow pointed out vestiges of Magdalenian art in the Ukraine.

1903 Peyrony discovered the engravings at Bernifal and La Calévie. Sierra discovered the paintings of Salitré. Fresh diggings at Kesslerloch by J. Nüesch. The painted caves of La Haza and Covalanas were discovered by Alcalde del Rio and Sierra. In October Alcalde del Rio discovered Hornos de la Peña, and a month later Castillo. Cabré discovered the painted rocks of Calapata (Eastern Spanish style). A. B. Cook traced a connection between painted pebbles and churingas, or Australian "bull-roarers."

1904 Engravings were discovered at La Grèze by Ampoulange. Piette established the chronological succession of Stone Age art in Quaternary times.

1905 The engravings of Teyjat were discovered by Peyrony, and the paintings at Santian by Alcalde del Rio. At the congress of Périgueux Breuil proposed a chronological classification of the paintings and sculptures, and showed that the Aurignacian age should be placed between the Mousterian and Solutrean ages.

1906 F. Regnault explored the cave of Gargas and recognised hand prints on the walls. Sierra discovered the engravings of Venta de la Perra and the black figure of Sotarriza. Alcalde del Rio discovered El Pendo. Dr Henri Martin observed traces of use on bones of Mousterian age at La Quina (Charente). Commandant Molard and his sons discovered the "Salon noir" at Niaux. Piette died.

1907 Breuil and Cartailhac pointed out bisons pierced by arrows at

Niaux, and noticed the first examples of engravings on the ground. Otto Schoetensack published the description of a very curious lower jaw found at Mauer, near Heidelberg, in a deep bed of sand belonging to an early epoch of the Quaternary age. This important fragment is one of the oldest bones, attributable to Man, which is known so far.

1908 A reindeer bone was discovered in the north-west of Spain. A Mousterian skeleton was found at Chapelle-aux-Saints (Corrèze) by J. and A. Bouyssonie and L. Bardon. It was that of a robust old man. Szombathy discovered the "Venus of Willendorf." Alcalde del Rio discovered Pindal, Quintanal, and Mazaculos. C. Rocafort studied the open air paintings at Cogul; and Breuil discovered a new gallery in the cave of Portel, and at Tayac the drawings of the cave of Gontran. Alcalde del Rio and Breuil discovered the La Loja, Cantabria.

1909 O. Hauser found at Combe-Capelle (Dordogne) the whole skeleton of a man belonging to the Aurignacian epoch, in a good state of preservation. Lalanne discovered the sculpture in relief at the rock shelter near Laussel. Alcalde del Rio discovered the paintings of Las Aguas de Novales, and Juan Cabré the painted rock shelters of Albarracin.

1910 Chiron and Cartailhac re-explored the caves of Chabot, finding numerous carvings. Breuil and Cabré studied the paintings of Albarracin and Batuecas. Excavations were begun at Castillo. Hipp. Müller noted painted pebbles found in the Drôme. Breuil discovered new engravings at Gargas, and reconstructed Piette's so-called sphinx into a bird. Breuil traced the drawings in the cave of Combarelles. Pascual Serrano discovered the friezes of Alpera. Breuil, Capitan and Peyrony published *La Caverne de Font-de-Gaume* at the expense of the Prince of Monaco; who founded an Institute of Human Palaeontology at Paris, of which Marcellin Boule was appointed director, and Breuil and Obermaier professors.

1911 Lalanne discovered bas-reliefs representing human figures at Laussel. Begouen discovered a sculpture on reindeer horn at Enlène. Obermaier discovered the painted and carved cave of La Pasiega, afterwards studied by Breuil, who also explored the rock drawings of Andalusia, and the south of the province of Murcia. Serrano discovered the paintings of Tortosilla. Peyrony began new diggings at La Madeleine and continued them in the following year. Sir Ray Lankester published in *The Field* a reconstituted design of the *bâton* found at Lorthet.

1912 Engraved bones were discovered in Bavaria for the first time. Two Laussel sculptures were discovered by the chief labourer employed by Lalanne and sold to the Berlin Museum by the connivance of Professor Verworn of Bonn. New discoveries were made at Champs-Blancs (or Jean-Blancs), at St Sulpice des Magnats (near the railway station of Couze), at Combe-Capelle, and at Sergeac, by Peyrony.

A fish carved in relief was discovered on the ceiling of a rock shelter of Gorge d'Enfer. Peyrony discovered two bas-reliefs on limestone at Champs-Blancs (or Jean-Blancs). Breuil worked at Malaga in the cave of La Pileta discovered by Colonel Willoughby Verner: at Tortosilla, and in the Sierra Morena (painted rocks). The brothers Begouen discovered two bisons modelled in clay at Tuc d'Audoubert. Breuil and Sollas found traces of paintings of unknown age in Bacon's Hole, in South Wales. Breuil, with Capitan and Peyrony, published designs of the carvings on the stalagmites of Teyjat. Sarasin showed painted pebbles from the cave of Birseck, near Bâle. Volkow published carved ivories from the Ukraine (feminine idols?), which had already been shown in Paris in 1909. Reinach proposed associating the Australian "ratapas" with the "little devils" of the *bâton* found at Teyjat and with other anthropoid figures of Quaternary art. Human remains discovered at Piltdown (Sussex) by C. Dawson.

1913 Diggings were carried on at Gargas by H. Breuil, E. Cartailhac, M. C. Burkitt, and H. Neuville.

1914 The painted rock shelter of Monte Arabi was discovered near Yecla (Murcia) by Breuil and M. C. Burkitt.

1915 The painted grotto of Comarque, in the valley of the Beune, was discovered by Breuil, Capitan and Peyrony. During the war Breuil resided in Spain, and, though occupied with war work, he studied the painted rock shelters at Almaden, in the Spanish second style, and also completed his study of some localities near Gibraltar of Spanish third style.

ADDENDA.

1858 Discovery of the Brixham bone cave.

1859 Examination by Boyd Dawkins of Wookey Hole, not far from Wells (Somerset).

1865–1880 Systematic exploration of Kent's Cavern by a Committee of the British Association.

1913 Fresh discoveries of paintings and engravings at Mas d'Azil by Count Begouen. Publication (Huxley Lecture) by Sollas of his explorations at Paviland (S. Wales).

1921 Public acceptance by Breuil, at Congress of Liège, of the human workmanship of certain of the flints found at Foxhall, etc., by Reid Moir who had studied for some years the Red Crag near Ipswich.

CHAPTER II

GEOLOGICAL CONDITIONS

THE science of Geology divides the world's history into what may be described as Five Volumes[1] and an Introduction. These are called:

Pre-Cambrian or Archaean	= Introduction.
Primary or Palaeozoic .	= Volume 1.
Secondary or Mesozoic	= Volume 2.
Tertiary	= Volume 3.
Quaternary . . .	= Volume 4.
Recent	= Volume 5.

These volumes are in turn divided into chapters corresponding to various deposits, determined by fossil contents, which are themselves related to the particular physical and climatic conditions of the period. In some cases these chapters can again be divided into what corresponds to pages or paragraphs. These final sub-divisions however have as a rule little more than local significance, and are manifestations of local physical and climatic conditions, while the more widely distributed deposits give us the chapters.

Of course it is not to be supposed that in nature there are any such hard and fast divisions in time, as the division into chapters and paragraphs would suggest. These artificial divisions correspond exactly to those of a large work on the history of some nation, where here and there some great event makes a natural division, but where more often the break is a purely arbitrary one. Geologists in different countries sometimes do not even agree as to where these divisions should be made.

There is no trace of Man or his civilisation in either the Introduction, Volume 1, or Volume 2, of this geological record. One school claims that they can recognise his first handiwork in Volume 3. The other school denies this, claiming that the human was first developed from the animal in Volume 4. The latest discoveries are all in favour of Man's Tertiary origin. At any rate we have much evidence of

[1] Volumes certainly of very unequal length.

Man's various civilisations during Volume 4 and so onwards until Man developed a written historical record, which event begins at an early date in Volume 5. It will be necessary first to consider the various chapters into which the third (Tertiary) and fourth (Quaternary) volumes are divisible; and later we shall have to try to correlate with these geological chapters the various sub-divisions into which the history of Man's civilisation is divided. In the Tertiary volume there are four chapters:

Eocene; Oligocene; Miocene; Pliocene.

In England the Pliocene chapter can be re-divided into a series of paragraphs:

7. Cromer forest bed series (Upper and Lower).
6. Weybourn Crag.
5. Chillesford Beds.
4. Norwich Crag.
3. Red Crag.
2. Coralline Crag.
1. Lenham Beds (the oldest).

These various Crags correspond to the deposits left by shallow seas encroaching over East Anglia.

The climate in Tertiary times was at first much warmer than it is to-day, and in the first two chapters (Eocene and Oligocene) we find a flora richer in genera than that of to-day, and some of these genera richer in species. Even in the upper half of this volume we find forests of a singularly uniform aspect, in which the same species of tree flourished contemporaneously from Tuscany to Central France, from the plains and borders of rivers and lakes, to the tops of the mountains. Some of these trees are now extinct, some only survive in southern and eastern regions, others (or closely allied species) still occur in Europe. The plane, various maples and elms, many walnut trees, hornbeams, laurels, ivy, sassafras, etc., all flourished at this time.

Towards the end of Pliocene times the climate of England became slowly arctic, a development which has been illustrated in tabular form by Dr Harmer from a consideration of the change in some of the more abundant and characteristic species of mollusca.

Name	Not known living per cent.	Living only in distant seas per cent.	Southern per cent.	Northern per cent.	S. and N. per cent.
Weybourn Crag / Chillesford Beds ...	11	0	0	33	56
Norwich Crag ...	11	0	7	32	50
Red Crag Butley...	13	4	13	23	47
Red Crag Newbourn	32	5	16	11	36
Red Crag Walton	36	4	20	5	35
Coralline Crag ...	38	4	26	1	31

These arctic conditions seem to have culminated in the Chillesford beds and the Weybourn Crag, for in the lower part of the succeeding deposits (Cromer forest) we have indications of warmer conditions, as in the base of the Cromer forest bed we find such mammals as: *Cervus etneriarum*, *Equus stenonis*, *Hippopotamus*, *Rhinoceros etruscus*, and in considerable numbers the remains of *Elephas meridionalis*. There are also forest trees, etc.[1]

As these had lived during Pliocene times in Italy and the south of France, it would seem that the climate of England in the age of the lower Cromer forest beds was rather warmer than the time when the Chillesford beds or their equivalent the Weybourn Crag were being laid down, as these contain a very cold fauna such as *Tellina balthica*, etc. In East Anglia the whole subject is complicated by the alternate depression and elevation of the land which took place there. At the end of the times of the Cromer forest beds we again get an arctic climate, as is indicated by the existence of the dwarf willow (*Salix polaris*) and the dwarf birch (*Betula nana*), which now live within the arctic circle.

This interesting deposit (the Cromer forest series), which as the reader will remember is itself only a sub-division of the Pliocene chapter, can be locally re-subdivided into five beds:

5. Arctic plant bed.
4. Yoldia (Leda) myalis bed. Marine.
3. Upper fresh-water bed.
2. Forest bed.
1. Lower fresh-water bed (bottom deposit).

[1] It would seem that the flora and fauna were not actually *in situ* in the Cromer forest beds, but it is difficult to believe that they were derived from any great distance.

As has been said the lower beds indicate a warmer climatic condition for England than is shown by the central beds, while the upper members of this Cromer forest series indicate the recrudescence of arctic conditions. Mr Lewis Abbott affirms that he has found humanly-made tools in the Cromer forest beds; some tools from these beds were studied by Prof. Breuil and the writer, who considered them of natural formation, though there may be others which are man-made, and it is probable that Man existed at that time.

Thus during Tertiary times, in East Anglia at any rate, we start with a warm climate. Towards the end, in Crag times, we have to deal with the oncoming cold of a glaciation, which seems to have been in turn followed by a slightly more genial climate, soon replaced however by another cold period.

The fourth volume of geological history may readily be divided into chapters by the alternate appearance and disappearance of glacial conditions in the northern hemisphere. It may be said at once that the exact number of glaciations and inter-glaciations of this arctic period has been a matter of great controversy, but glacial and inter-glacial periods combined make up the "great Ice Age." There were probably four glacial cycles in the Alps, but that does not necessarily mean that elsewhere, and especially further north, there were the same number. Going from south to north the mean annual temperature naturally grows lower, and it may be that at the latitude of Great Britain the rise in temperature of each inter-glacial period did not reach a height sufficient to melt all the ice left by the preceding glacial period and so produce an inter-glacial epoch. But even in the Baltic regions we have likely evidence of at least two glaciations, with a correspondingly warmer period between them, this being proved by the fauna of the so-called Eemian deposits, which lie stratigraphically between two glacial moraines.

A word or two will have to be said on

A. The origin of the Ice Age as a whole.

B. The succession of glacial and inter-glacial epochs in the Ice Age.

C. The remains left by the glaciations.

A. *The origin of the Ice Age as a whole.*

A great Ice Age may not have been an unique occurrence in the history of the world; for example, there may have been an Ice Age at the end of the Permian chapter of Volume 1 in England[1]. In Australia there was certainly one of this age as well as an earlier one in Cambrian times. Very little is known about the subject, and there is absolutely nothing to tell us whether these early Ice Ages were similar to the one in Volume 4 in being composed of glacial and inter-glacial periods. As regards the origin of the one we have especially to deal with, there is a great mass of literature, and numerous theories have been put forward. It should be remembered that no very startling reduction in the mean annual temperature is necessary to produce one of these glacial periods. It must not be concluded that the whole of the northern hemisphere was covered with an ice sheet, as is the case with Greenland to-day; though it is true that during the major part of this period, northern England, Scotland, Scandinavia, and the Baltic provinces were so covered. Further south the land was comparatively free from ice, even during the maximum of the glaciation, except in the vicinity of mountains and highlands, from the fastnesses of which glaciers spread out over the adjacent lands. It should however be remembered that the presence of an ice sheet to the north, and greatly swollen glaciers in all the mountain regions, would keep the temperature down, and would prevent even a hot summer from really warming up the land, especially if the summers, as we shall see from astronomical reasons, were probably short. No doubt we shall not be far wrong if we consider the climate of large tracts of France at that time to have been similar to that of parts of Siberia to-day. Some people, like the late Professor Hughes of Cambridge, have suggested that a change in certain geographical conditions would be sufficient to account for the reduction in the mean annual temperature. Certain mountain masses may have been higher, and their upper fastnesses may have been the cradles of large glaciers which kept the surrounding atmosphere cool. This possibly was

[1] This is considered likely from the presence of striated boulders in the deposits.

the case in Scandinavia. Slight alteration in the position of capes on the American coast may have diverted the Gulf Stream from our shores; and this would have left us with a climate similar to the present climate of Labrador, which lies in the same latitude.

Other people have called astronomy to their aid, and have suggested that the combination of two astronomical causes would explain the phenomena. These two causes are:

1. The precession of equinoxes, which has a period of 21,000 years.

2. The slow change in the eccentricity of the Earth's orbit round the Sun, which varies periodically from a circle to an ellipse with the Sun as one focus.

If an ellipse is drawn with the Sun as one focus, and the Earth is shown with its axis as oblique to this ellipse, and

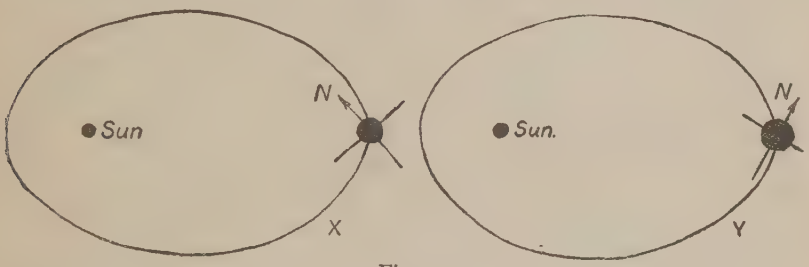


Fig. 1

one end of the axis is marked north, two extreme positions are possible. The Earth may be at that end of the ellipse which is nearer the Sun, or it may be at the end of the ellipse which is further from the Sun; in the first case it is said to be in perihelion, in the second case in aphelion. Consider for a moment figure X (Fig. 1) in which the Earth is in aphelion, and the obliquity of the axis is such as to point the northern hemisphere towards the Sun. Now the obliquity of this axis changes, the end of it precessing in a circle every 21,000 years. At the end of half this period then, the figure X becomes figure Y. Apart from radio-activity in the Earth itself, the Earth temperature is kept up solely by radiations from the Sun, and the amount of heat derived from these radiations depends largely on whether the Sun's rays strike a given portion of the Earth normal to it, or at a

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high angle. The Sun has less power in winter because it is lower on the horizon, and its rays therefore strike our northern hemisphere obliquely. Again, it is obvious that the Earth in perihelion derives more heat from the Sun than in aphelion, because it is nearer the source of energy. At present the Earth's orbit round the Sun is fairly circular, there being a difference of less than three million miles between the distance of the Earth from the Sun when in perihelion and aphelion. It is obvious that the seasons are just the reverse of each other in the two hemispheres, but the northern winter is modified by occurring when the Earth is in perihelion, and therefore nearer the Sun.

But suppose a precession of equinoxes and a much larger eccentricity in the Earth's orbit. There is evidently a period when the northern hemisphere would get a short hot summer, being in perihelion with its northern axis pointing towards the Sun, but a long and dreadful winter, being in aphelion, at the end of the long ellipse, with the northern axis facing away from the Sun. The short hot summer would be unable to modify the cold dreadful winter. If Greenland to-day could be cleared of ice, the ice would probably not re-form, but the temperature of the land cannot rise above freezing point till all the ice is melted, and as soon as a hot summer attempts to do this, fogs arise which impede the heating action of the Sun. This astronomical theory was suggested by Dr Croll, and for the effect to be at its maximum in the northern hemisphere the precession of equinoxes must have swung the northern pole 180° from its position to-day; and this at a time coincident with the moment of the greatest eccentricity of the Earth's orbit.

It has been suggested that the change in the eccentricity of the Earth's orbit originated the Ice Age, whilst the precession of equinoxes during that period controlled the duration of the several glacial and inter-glacial periods of the Ice Age. There are several difficulties in the plain acceptance of this theory. To begin with it would make the Ice Ages strictly periodic in the Earth's history, and this, as far as we can see, we do not find to be the case. Again, it would follow that the glacial and inter-glacial periods of the Ice Age are strictly complementary to one another in the

two hemispheres. This does not seem to be the case, though strict correlation in time of Ice Ages in different parts of the world is naturally an almost impossible task. We find indications of a Pleistocene glaciation in Australia, in North and South America, and in the Antarctic, at which time the ice must have spread out, according to Major Priestly, hundreds of miles beyond the present limit. Of course it may be argued that these southern hemisphere glaciations corresponded with inter-glacial periods in the northern hemisphere. This does not seem to be the case with North and South America. There is also an indication of a glacial period in Pleistocene or recent times in Africa, at Kilimanjaro. It is more probable that a conjunction of the various circumstances, including the astronomical causes, originated the Ice Age, and that the astronomical causes further determined the length of the various Ice Age epochs.

Others have shown that the polar axis, and with it the position of the poles, has moved, and that a north pole situated further south than at present would explain the glaciations in the northern hemisphere. However, the poles do not seem to move far enough to afford a sufficient cause for the phenomena which we observe.

It has also been suggested that the world may have been travelling at the time of the Ice Age through cold areas in space. This latter theory has the great advantage that it can neither be proved nor disproved.

B. *The succession of glacial and inter-glacial epochs in the Ice Age.*

The question of the periodicity of the Ice Age, that is of the recurrence of glacial and inter-glacial periods, has been a matter of heated controversy. There are those, chief of whom are Dr Albrecht Penck and Dr Hugo Obermaier, who affirm that there were four glaciations. Others, including M. Boule, are content with three, whilst others again, especially geologists in the north, claim that there was only one glacial period.

As has been suggested it may be merely a question of latitude, and further north where the mean annual temperature is obviously lower, the inter-glacial period would

necessarily be shorter and cooler. The student may remember that to-day at the north pole, where the sun is never hot enough to melt all the ice, we have a glacial period. Drs Penck and Obermaier have traced four glaciations in the Alps and in the Pyrenees respectively, and the late M. Commont demonstrated a similar state of affairs in the Amiens district. These four glaciations have been named after four little rivers that flow down from the northern slopes of the Alps:

Würm (the latest); Riss; Mindel; Günz[1].

Between each of these periods there were warmer interglacial periods; these were the Günz-Mindel between the Günz and the Mindel glaciations according to the Penckian scheme, then the Mindel-Riss between the Mindel and the Riss glaciations, and the Riss-Würm between the Riss and the Würm glaciations. Before discussing these periods in detail it will be well to study the phenomena from which our knowledge of glaciations is obtained.

C. *The remains left by the glaciations.*

A glacier is only a river of ice that flows down the mountain side, gouging out a U-shaped channel for itself and leaving no spurs on the valley sides as a river does. It bears on its surface the debris of rock which has fallen there on its passage; and on reaching lower altitudes the glacier melts and a river issues from it. The debris of material carried, known as the moraine, either remains in long belts on the edge of the glacier or, when two separate glaciers join, the two lateral moraines become a medial one from the point of junction. A glacier also ploughs up its bed in moving, grinding the material *en route* and forming a bottom moraine (*moraine profonde*). At the foot of the glacier all morainic debris is deposited in a sort of crescent-shaped mass called a terminal moraine. It is the occurrence of a sequence of these moraines in the highlands of Europe that has given rise to the poly-glacial theory of the Ice Age. The various terminal moraines, corresponding to the different glaciers of

[1] M. Boule considers that it is not till we get to Penck's Mindel deposit that we have real evidence of a first glacial period; he brackets the Mindel and Günz periods together.

the several glacial periods, are not found in superposition. In the Alps, for example, the terminal moraine corresponding to the third glacial period lies further from the source of the glacier than that corresponding to the glacier of the fourth glacial period, though it flowed from the same valley. This indicates that the third glaciation was more intense in the Alps than the fourth. There was more ice, and so it spread further out into the plains. It should be noted that except in such cases as these, where the deposit left by a glaciation has not been reached by succeeding ones, subsequent glaciers tend to destroy the remains left by the previous ones as they flow over them.

Let us consider next what phenomena we may expect to find in areas that have not been under direct glaciation. An ordinary river flows down from the highlands to the sea; in passage it gathers a certain amount of energy according to the slope of the ground, and the volume of the water. This energy is expended either in deepening its bed, or eroding the banks laterally. In this way material is actually removed. If for any reason the slope becomes less, or the stream ceases to flow so strongly, the energy is lost, and the debris in process of transport is thereupon re-deposited.

Now consider the river which issues from the foot of a glacier. Suppose for any cause the mean annual temperature is rising, we should then find that the glacier was melting and retreating. The river issuing from it would therefore increase in size, increase in energy and cut its bed down to a lower level, transporting the material. Suppose on the other hand the mean temperature was decreasing, less ice would melt, the glaciers would advance, the stream issuing from the glacier would dwindle, would have less energy, and far from eroding its bed, the river would rapidly have to re-deposit the material brought down from the glacier. We should thus expect that these glacial streams would in glacial times spread out terraces of gravel derived from moraine material over which they had passed, and this material would be partially removed by the river when deepening its channel in a following warmer period.

One of the places where these phenomena can best be studied is the Pyrenees region, where the conditions have

been so ably described by Dr Obermaier. There three terraces can be observed, and probably a fourth. These terraces are traceable up to and into the moraines of the various glaciers that correspond to them. A very good place in the Pyrenees for observing these terraces is the road that runs from Aventignan, near Montréjeau, to the prehistoric painted cave of Gargas. On leaving the little village of Aventignan the tributary of the Garonne flowing close by is crossed, and directly afterwards the road climbs the steep gravel bluff of a first terrace. The road then continues across the flat plain till the gravel bluff of a second terrace is reached, thence in the same way we reach a third. Three terraces only are clear at this particular place[1].

Further north, in the Amiens district, Commont has recognised four terraces flanking the valley of the Somme. Here however there were no glacial streams involved, and the gravels were purely fluviatile instead of glacio-fluviatile. The formation of glaciers elsewhere in France absorbed a large quantity of water, thus cutting off the supply of atmospheric moisture, thereby causing the Somme river of those days to dwindle and therefore to deposit the gravels. A succeeding genial climate melted the ice, increasing the moisture, which swelled the river, and enabled it to cut a new deeper channel in these gravels. A certain amount of earth movement in N. France has complicated the story. During the periods just preceding and following a glaciation, when the moisture of the atmosphere had been condensed by freezing into the first appearance of glaciers, or had not yet been wholly liberated by the oncoming genial period, we get cold dry steppe conditions in Western Europe. This condition was favourable to the formation of deposits known as loesses. These loesses are usually buff-coloured sands, and are found over the whole of Europe and Asia. They appear both in the bottoms of valleys and on the tops of hills, and owe their occurrence in most part to wind action. They were deposited by the cold dry blasts raging in these areas over what must have been arid steppes.

Only two loesses of different ages (each divisible into at least three layers not differing much in age) have so far been recognised with certainty, and much controversy has

[1] See addendum note, page 32.

raged over the question as to which glaciations they are to be referred. The late Professor Commont, who had studied them much at Amiens, came to the conclusion that the older loess should be referred to the steppe times just preceding the last glaciation; while the younger loess was just post-glacial. Certain local peculiarities have enabled him to correlate the two loesses at Amiens with the two loesses of the Rhine valley; and these in turn have been traced backwards towards the Alps, until they come in contact with glacio-fluviatile material of their respective glaciers.

As geologists now seem agreed that the upper loess does in fact rest on the lower terrace, its formation must be later than that of the lower terrace, which was due of course to the last glaciation.

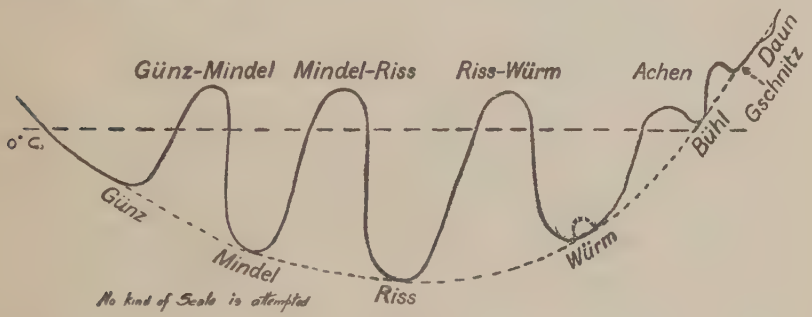


Fig. 2.

It should be remembered that in any ordinary undisturbed geological or archaeological strata, formed by the *deposition* of material, the lower layers are older than those above them. This is known in geology as the Law of Stratigraphical Succession. In the case of river terraces, on the other hand, where the differences in level are due not to *deposition* but to *denudation*, the opposite holds good, the upper terrace being the older, and the lower terrace the newer, though the actual material may be older.

The change in temperature which gave rise to the Ice Age may be considered in the form of a curve, the curve itself not being smooth, but composed of undulations.

In the Alps during the Günz glaciation the level of the snow was 1200 metres lower than it is to-day; during the Mindel and the Riss glaciations, 1300 metres; during the

Würm glaciation 1200 metres. The minor oscillations following the Würm did not give rise to true glaciation in France, though in higher latitudes they may have done so. In the Achen period following the Würm glaciation the snow was only 700 metres lower than it is to-day, but in the succeeding Bühl period this level sank to 900 metres. This was certainly a very cold time, for the reindeer spread as far south as Mentone; and it may be that only a lack of the moisture necessary to form glaciers prevented it from being a true glaciation in France. The succeeding Gschnitz and Daun periods were only interludes when the level of the snow which had been steadily rising remained stationary at 600 metres and 300 metres respectively below the modern level. The main curve of temperature of the Ice Age may be considered as a primary curve; the curves which gave rise to the glacial, inter-glacial, and post-glacial oscillations as secondary curves.

In the case of the Würmian glaciation there seem to be indications of even a tertiary curve, superimposed on the secondary curve, which gave rise to a slightly warmer moment in the middle of the Würmian glaciation. At this time the snow was only 1000, instead of 1200 metres below the level of to-day. This is called the minor oscillation of Laufen. These minor changes are very difficult to demonstrate, and even then may be of only local significance, and determined by local conditions.

The glacial periods have been tabulated by Dr Obermaier. See opposite page.

At the beginning of this chapter, a short account was given of the Tertiary deposits in East Anglia, and their story was carried on to the Cromer forest series where English geologists commence their fourth volume. We have noted that the cold conditions which seem to culminate in the Chillesford beds and the Weybourn Crag of East Anglia were followed by more genial conditions in the lower members of the Cromer forest series.

Are we to recognise in this the indication of an early glacial period followed by an inter-glacial? If this could really be demonstrated it would probably be simpler to end the Tertiary series with the Chillesford beds, and throw the

Obermaier's Chart of Glaciations.

Glacial periods	Glacial deposits in environs of district of glaciation	Difference in the level of the perpetual snow in diluvial and actual time
1. Günz	Gravels of the highest top terrace (Deckenschotter)	Ca. 1200 metres
1. Inter-glacial period.		
2. Mindel	Gravels of the lower high terrace (Jungerer Deckenschotter) ...	1300 „
2. Inter-glacial period.		
3. Riss	Gravels of the lower top terrace (Hochterrassenschotter) ...	1300 „
3. Inter-glacial period.		
4. Würm	Gravels of the lower bottom terrace (Niederterrassenschotter)	1200 „

Period	Phases	Limit of perpetual snow
Würmian	First maximum ...	1200 metres
	Oscillation of Laufen	1000 „
	Second maximum ...	1200 „
Post-glacial period	Retreat of Achen ...	700 „
	Advance of Bühl ...	900 „
	Era of Gschnitz ...	600 „
	Retreat of Daun ...	300 „

Dr Obermaier's work in the Pyrenees in 1905 indicates a similar state of affairs there.

whole Cromer forest series into the fourth Volume. As has been stated the top of the Cromer forest bed indicates the fresh oncoming of arctic conditions, and resting on the top we get the Cromer Till, and the Contorted Drift. Inland and towards the west these two are indistinguishable. This Cromer Till is a rough unstratified bluish-grey clay, occasionally divided into two by a band of laminated clay. It rests upon the top member of the Cromer forest series, or some other division of the topmost Pliocene, and contains many boulders of northern origin including examples of the well-known rhomb porphyry of the Christiania region in Norway.

The Contorted Drift which is so prominent in the Cromer cliffs forms a more or less continuous sheet in the north and east of Norfolk. Patches are even found as far south as Sudbury and Bury St Edmunds. The later deposits of

Chalky-Boulder-Clay overlap it towards the chalk escarpment. This Contorted Drift is often clearly stratified, though the stratification has been twisted in a fantastic manner; it is a yellowish or brownish loam, with seams of gravel, sand and clay, and also contains boulders of igneous rock, of far distant origin. In certain places, such as at Norwich and at Yarmouth, the strata have not been twisted, and lose the contorted aspect. It is possible that the Cromer Till and the Contorted Drift are not all of one age. Beds of gravel occur occasionally which may indicate warmer conditions between two cold periods. For the moment, however, it may be better to consider this idea as being still unfounded on any demonstrable facts.

Evidence seems to be accumulating that the Cromer Till and Contorted Drift deposits correspond to another cold period in England, equivalent in time to the Rissian glaciation of the Alps[1].

In certain parts of Norfolk and Suffolk, lying between this Contorted Drift and the over-lying boulder-clay, there are a series of sands known as the mid-glacials. They contain a fauna of warmer character composed of marine shells and ostracods. In some places where the Contorted Drift is absent they rest unconformably on older beds. This is the case for example at Bolton and Laughlin's brick-field near Ipswich, where they rest unconformably either on Red Crag or London Clay. The occurrence of a layer of boulders at the base of this bed would be due to Contorted Drift times.

These mid-glacials at Ipswich and elsewhere are overlaid by the great mass of the Chalky-Boulder-Clay. This vast sheet of material may be considered as the bottom moraine of a great ice sheet. It extends southwards to Muswell Hill, in the north of London, westwards as far as Warwickshire, and northwards into Lincolnshire. The boulders it contains tend to be more generally of British origin, and attempts have been made to determine whether a patch of glacial clay should be referred to the age of the Contorted Drift, or the Chalky-Boulder-Clay, by ascertaining whether or not a large number of boulders of Scandinavian origin are found in it. A high percentage would indicate the earlier, Contorted

[1] See however Addendum note to p. 52 on p. 60.

Drift times, and a low percentage the later, Chalky-Boulder-Clay times. It is very uncertain whether this is a satisfactory criterion, as the percentage would be likely to alter in different areas, according to whether the area was far from or near the east coast.

Tracing the Chalky-Boulder-Clay northward into Lincolnshire, we find it is bounded on the east by the escarpment of the chalk wolds. On the opposite side of this chalk escarpment we get a totally different series of glacial deposits:

Sewerby Gravels; Hessle Boulder-Clay; Purple Boulder-Clay; Basement Clay; Chalky Rubble; Infra-glacial Beds.

The exact relation of the Chalky-Boulder-Clay to the west of the escarpment with the lowest member of the series to the east has never yet been definitely determined, and much controversy rages over it.

The infra-glacial beds contain the remains of *Elephas antiquus*, rhinoceros, hippopotamus, and other warm mammalia.

The Hessle Boulder-Clay contains a small proportion of Scandinavian boulders. The succeeding Sewerby gravels seem to be post-glacial and follow the lines of the existing valleys. Is the Hessle Boulder-Clay newer or of the same age as the Chalky-Boulder-Clay? If of the same age, then the infra-glacial beds would be equivalent to the mid-glacials of East Anglia.

Dr Bonney has lately informed the writer that he considers that the Hessle Boulder-Clay is newer than the Chalky-Boulder-Clay. It may be that the tops of these east wold drifts are of Bühl times, and are equivalent in age to the drifts that overlie Upper Palaeolithic industries in North Welsh caves.

In other places in East Anglia the Chalky-Boulder-Clay is often capped by masses of gravel which are of later date. This often occurs on the tops of hills, and they are not referable to existing valley systems. Their origin is often obscure and the whole matter is complicated by the various uplifts and depressions of the lands since glacial times.

On the north coast of Wales, from Colwyn Bay eastwards, the following succession of glacial deposits is said to be recognisable:

4. Boulder-Clay with northern boulders and marine shells.
3. Sands and Gravels with northern boulders and marine shells.
2. Boulder-Clay with northern boulders and marine shells.
1. Boulder-Clay with Welsh boulders and no shells.

Whether or not we shall be able to correlate these deposits with our glaciation scheme remains to be seen. Much further work on our glacial deposits is required in the light of modern foreign discoveries. A proposed correlation with the French scheme is attempted in the next chapter.

The post-glacial gravels in East Anglia are themselves covered in places with deposits of peat, etc.; but these are more in place in the fifth volume of the geological record.

ADDENDUM NOTE

Another suggestion as regards river terrace formation has lately been put forward which has been favourably received by Professor Sollas. It depends on changes in the relative position of land and sea due to earth movements. Around the Mediterranean and the North Eastern shores of the Atlantic can be traced four ancient beaches, which occur at constant heights, the oldest resting on a Pliocene deposit. It is affirmed that the three lower beaches correspond with the three lower terraces of the Rhone, Somme, and Isser (Algeria) valleys; that these terraces, which yield at their bases a fairly warm fauna (*Elephas antiquus* and *Hippopotamus*), were formed during a warm period by the sea when it invaded the land, owing to regional earth movement. It is considered that Quaternary Times as a whole were warm, though divided by short glacial periods, at which time the sea retreated from the land. The alternate advance and retreat of the sea can be explained, it is said, by a general deformation of the globe, perhaps due to the weight of the ice caps of the glacial periods. These ideas should be kept in mind, but, even if partly true for certain cases, it is difficult to see how all the phenomena in various districts can be thus explained. For further information and references to original authors the article "Man and the Ice Age," by Professor Sollas (*Geological Magazine*, Vol. LX, No. 703, Jan. 1923), should be consulted.

CHAPTER III

MAN IN RELATION TO GEOLOGY

HAVING briefly described the geological changes which took place from the end of tertiary times, through the quaternary age, until the recent era, and sketched somewhat hastily the changes in climate which have been observed, it will now be necessary to discuss first of all the various archaeological sub-divisions into which the different civilisations of Man fall, and then to trace their relation to the geological divisions.

As long ago as 1836 Christian Thomsen established in Denmark three successive Ages: Stone, Bronze and Iron. Whilst these three are still the main stages, each of them is now further sub-divided into periods connected with definite cultural changes. In early times Man made his weapons of stone, knowing nothing about the smelting of ores. Later we have a period when he learnt to smelt the easily reducible copper ores; this was probably discovered by chance on the ordinary hearth, possibly in some region near Mount Sinai, where copper ores abound. How he gained the knowledge that this copper was hardened by the addition of other ores, especially those of tin, thus forming Bronze, is a profound mystery for which various unsatisfactory theories have been advanced. Finally, when Man became skilful in smelting, he discovered that a harder metal could be produced from other (iron) ores. With the use of iron, Man passed into the Iron Age. Quite recently he learnt how to harden iron by the addition of carbon (steel), and still more recently to harden it yet more by the addition of tungsten, etc. These two discoveries though in the same series as the discovery of iron, produced of course a less fundamental change in civilisation than the discovery of metal, and the manufacture of articles from metal instead of from stone.

The only way of finding out how Man lived before historical records were invented is to examine his home and its surroundings; and here it will be well to consider the history

of the deposits in a cave or rock shelter from the time Man first inhabited it to our own day. For this purpose we will consider the deposits in King Arthur's Cave in Herefordshire. This was carefully explored by the Rev. W. S. Symonds in 1871, and lies about 300 feet above the present level of the river Wye. When the floor was dug down to the native rock, the following deposits were exposed in section.

8. Debris, post-glacial.
7. Stalagmite, sterile.
6. Cave earth, 3 ft thick. Uppermost Pleistocene, containing human implements, and remains of lion, cave bear, hyena, mammoth, rhinoceros, and other mammals.
5. Stalagmite, sterile.
4. Red Sand, $3\frac{1}{2}$ ft thick, containing silurian pebbles from Breconshire, 70 miles distant. This layer is therefore either the old bed of a river, possibly the Wye, which now flows 300 feet below the cave, or more probably a tributary of the Wye.
3. Thick layer of stalagmite.
2. Cave earth. Exact thickness not recorded, but thicker than upper layer of cave earth. Contains human implements of Aurignacian age (?), and remains of lion, hyena, horse, mammoth, rhinoceros, bison, and other mammals, interlaid with stalagmite.
1. Floor of the cave.

We find therefore the cave partially filled with a series of deposits that have accumulated on the floor since the time of its formation by some river system now flowing in other channels. The formation of caves may be studied in any text-book of geology dealing with the denudation of limestone countries. The deposits in the mouth of caves are either laid down by water, or, when the cave was dry, by material fallen from the roof, etc. When Man inhabited the mouth, the debris that was forming consisted largely of the bones of the animals he had eaten, and thrown on one side, the ashes from his fires and any chance tool or object that he threw away. These deposits are of exactly the same nature as any other geological strata, and the geological law of the succession of beds holds good. This law of suc-

cession states, that if the beds are deposited one on another and there has been no subsequent earth movement, then the lowest bed must be older than the one above, which in turn is older than the one above it. If, therefore, the lower bed is older than the one above it, then the archaeological contents must be older too; it follows that the industries in the lower bed are older than those in the upper one.

The geological law of superposition is excellent on paper, but in applying it the student must be careful. The law holds good of course in cases where the various beds are horizontal, especially if they have been divided from one another by beds of hard stalagmite and when the whole deposit has been undisturbed, for instance sealed in by a landslide or the like. These conditions are naturally seldom realised. There are no greater enemies to the Prehistorian than the badger, the rat, the rabbit, etc. Unless the deposit has been sealed in or unless there are hard layers of stalagmite which these animals cannot penetrate they will make a transposition of material which will render any stratigraphy completely useless. Such for example is the case in the famous cave Victoria Cave, near Settle in Yorkshire, where we find a perfect "salad," there being the bones of cave bear in the Romano-British layer, a bone cut with a metal knife at the bottom, and the remains of sheep and goats at various levels. Not only do these animals bring objects from the lower to the upper levels and vice versa, but in some places as at Victoria Cave where the bottom beds slope up towards the back of the cave, they push objects from the earlier deposits at the back of the cave outwards to the front, and thus into layers of later date.

In digging the student should remember three things:

(i) Stratigraphy.

(ii) Preservation (amount of alteration and mineralisation of bones, patina, etc.).

(iii) Species of animals and types of implements.

If the evidence of these three agree then we may be certain in our deduction. If any two agree against a third, we shall probably be right in our deduction, but if, as in the case of Victoria Cave, all three disagree, then we can hope to gain but little by further digging.

The possibilities of error as regards stratigraphy have been dealt with; those of preservation are equally obvious. An extensive deposit sometimes varies in different parts of the same level; there may have been a stream in one part which produced a rolled or polished effect on the objects in its vicinity, which would then have a different appearance from objects of the same age elsewhere. Again, an object occurring under a patch of stalagmite may be partially protected from moisture, etc., which produces a further alteration on unprotected objects of the same age. Also the mineralisation of bones is not only a function of time, but also depends on the material on which the particular bone lies. As an example of the use of preservation to the Prehistorian, Victoria Cave may again be cited where a flat harpoon in reindeer antler of Azilian type was found side by side with a carved bone bead certainly from the Romano-British layer. Not only had the ends of this bone bead been cut with a metal knife, but there also remained a quantity of gelatine in the material; the harpoon on the other hand looked and felt old, and was completely mineralised. Again it may be noted that the hippopotamus bone from the bottom beds of this Cave is much older than the bed, judging from its preservation: it is so rolled that it has become practically a pebble, and was probably washed in when the layer was in course of deposition.

Types of animals and implements are also very useful and help to tell us if there has been a shifting of material or not. Domestic sheep do not occur in inter-glacial times, nor does mammoth in Roman times. When we have a collection of implements we can often determine their age with a fair probability and above all is this true when we have decorated bone implements. The rate of the accumulation of deposits varies enormously in different caves and at different times in the same caves. In King Arthur's Cave it was probably fairly rapid, for the human industries do not differ much from each other, and are probably separated by no enormous gap of time. On the other hand, we often find caves or rock shelters, especially in France, which when excavated display a section showing layers containing very dissimilar humanly-made tools separated from each other by a large gap in time, though by no great thickness of deposit.

The chronological order in which the various industries are found is always the same over widely separated regions.

Thus, if at one place there are three beds one on the other, each containing its special industry, then at another place where these three industries occur, they will be found in the same stratigraphical relationship to one another. In looking at a series of deposits in section it is as if we were looking at a book laid horizontally, when the last pages of the book would be on the top, and the first pages at the bottom.

These dissimilar industries cut the Stone Age into a number of sub-divisions corresponding to different cultures; these cultures themselves depending either on direct evolution of a previous culture or on a new civilisation arriving in the particular area in question either by infiltration, as was the case, in later times, of the Aryans, who filtered in as a nomadic people amongst the Dravidian folk of North India, or more rarely with the invasion of a conquering people.

The Stone Age is first divided into two main eras:

The Old Stone Age, or Palaeolithic.

The New Stone Age, or Neolithic.

Each is in turn sub-divided. There is such a fundamental difference between the Palaeolithic and the Neolithic ages, that they are treated of quite separately.

Palaeolithic Man only chipped his implements, was a hunter knowing nothing of agriculture or domestic animals and never made real pottery. Neolithic Man, on the other hand, belonged to a totally different race, that swept into Western Europe, having a knowledge of agriculture, domestic animals, and pottery; and he often polished his stone implements. In certain parts of the world he learnt at an early date to smelt copper, and harden it with tin, and as this discovery spread, Man passed insensibly into the Bronze Age. The various sub-divisions of the Palaeolithic age are named after certain places in France, where the particular culture is very distinctive, and as will be seen each of these is further divided into smaller sub-divisions shown by slight changes in the industries found in various superimposed layers at those places where the particular sub-division is well represented.

Table of Palaeolithic Civilisations.

Upper Palaeolithic

- Azilian[1].
- Upper / Lower — Maglemose in Scandinavia (?). Migrations westward due to Neolithic pressure from the east.
- Magdalenian.
  - Upper. M. 6. (*b*) / M. 6. (*a*) — Double-row harpoons.
  - Middle. M. 5. Single-row harpoons.
  - Lower. M. 4. Primitive harpoons.
  - M. 3 / M. 2 / M. 1 — No harpoons, but lance-points.
- Solutrean.
  - Upper. Shouldered points.
  - Middle. "Laurel-leaves," no shouldered points.
  - Proto. Solutrean trimming in places on the implement, and no good "laurel-leaves."
- Aurignacian.
  - Upper. Gravette points with shouldered points at the end of the period.
  - Middle. Beaked gravers and keeled scrapers, split base bone points.
  - Lower. Châtelperron points.
- Transition. Audi points.

Lower Palaeolithic

- Mousterian[2].
  - Upper. No *coups-de-poing*, Mousterian points, side-scrapers and utilised bones throughout Mousterian times.
  - Middle. Mousterian trimming, few *coups-de-poing*.
  - Lower. Mousterian trimming, many *coups-de-poing*, and Levallois flakes.
- Acheulean.
  - Upper. Levallois flakes, fine *coups-de-poing*.
  - Lower. Oval *coups-de-poing* sometimes with twisted edge.
- Chellean.
  - Upper. Long pointed *coups-de-poing*, flaked all over but with an uneven serrated edge.
  - Lower. Pointed *coups-de-poing* of medium length, uneven serrated edge, often some crust left on the butt-end. First appearance of almond-shaped *coups-de-poing*. A few awls and scrapers.
- Pre-Chellean. Very rough *coups-de-poing* often with crust on butt-end, sometimes like rough hand-picks.

[1] Azilian, classed as Transitional period by some writers.
[2] Mousterian, classed as Middle Palaeolithic by some writers.

Azilian is named from the cave of Mas d'Azil (Ariège).
Magdalenian, from La Madeleine near Les Eyzies (Dordogne).
Solutrean, from Solutré near Mâcon in Eastern France (Saône et Loire).
Aurignacian, from Aurignac, a small rock shelter now quarried away (Haute Garonne).
Mousterian, from Moustier, a rock shelter about 6 or 7 miles from Les Eyzies.
Acheulean, from the quarries of St Acheul, a suburb of Amiens.
Chellean, from the quarries of Chelles-sur-Marne (Seine et Marne).
Pre-Chellean are deposits which stratigraphically are earlier than the Chellean.

The most complete station known is that at the mouth of the cave of Castillo (Puente Viesgo, near Santander), Cantabria, Spain. Nearly all the different ages known are represented.

Section of the cave of Castillo, Puente Viesgo, Cantabria.

Stalagmite and rubbish.
Neolithic and later.
Stalagmite.
Azilian in parts.
Stalagmite.
Upper Magdalenian (stag's bones).
Loam and matrix.
Lower Magdalenian (some reindeer bones).
Loam.
Lower Solutrean ("laurel-leaves" and some reindeer bones, but no shouldered points).
Loam.
Upper ½ of Aurignacian period (*a*), (some reindeer bones).
Loam.
Upper ½ of Aurignacian period (*b*), (stag's bones).
Loam.
Upper ½ of Aurignacian period (*c*), (stag's bones).
Loam.
Lower ½ of Aurignacian period (*d*), (*Rhinoceros merckii* bones).
Stalagmite.
Mousterian (*a*), (*Rhinoceros merckii* bones).
Loam.
Mousterian (*b*), (*Rhinoceros merckii* bones).
Stalagmite.
Matrix (rough quartzite flakes. ? Acheulean. One reindeer bone at base).
Rock base of cave.

Further down the hill nearer the river was found an open station with quartzite flakes and *coups-de-poing* in the same material; these may well be of Lower Palaeolithic age before the cave above was properly inhabited.

In future chapters it will be our task to deal successively with the various industries and try to describe the civilisations that they imply.

Two separate tasks remain for us in this chapter, viz. to trace

1. The succession of the mammalia in quaternary times and their correlation with Man's civilisation.
2. The actual relation of Man's civilisations to the geological divisions which we have already denoted.

1. *The Succession of the Mammalia.*

As has been pointed out, though the mammalia and other fossils are far from acting as delicate thermometers, they give us very precious data as to the changes of climate. For this purpose the animals can be divided into:

Tundra animals (i.e. climate cold and moist).
Steppe animals (i.e. climate cold and dry).
Southern animals (i.e. climate warm).

At the maximum of the cold period of a glaciation the tundra animals are far the most numerous while both before and after the glaciation a great number of steppe animals are found. During the genial period of an inter-glaciation many southern species appear that have come from the south. It must always be remembered that the whole question largely depends on the percentage found of the different varieties of animals and that some species can survive changed conditions. After a genial period, in steppe times for example, we find a considerable number of animals still surviving from the previous inter-glaciation. If we are dealing with the opposite slope of the glaciation tundra animals continue to survive and mingle with the warm fauna arriving from the south. Again it should be remembered, that though temperature is by far the most important factor in determining the variety of animals, dampness or drought has a considerable influence. This is partly a function of temperature, but is also determined by local physical conditions. Dampness as well as temperature determined the vegetation on which certain of the mammalia lived. Naturally carnivora are less affected by these conditions, and they frequently survive under varying conditions of climate.

Some of the animals usually characteristic of Arctic Tundra conditions.

1. Reindeer (*Cervus tarandus*).
2. Musk ox (*Ovibos moschatus*).
3. Banded lemming (*Myodes torquatus*).
4. Obi lemming (*Myodes obensis*).
5. Arctic fox (*Canis lagopus*).
6. Variable hare (*Lepus variabilis*).

7. Mammoth (*Elephas primigenius*).
8. Woolly rhinoceros (*Rhinoceros tichorhinus*).
9. Glutton or wolverine (*Gulo borealis* or *Gulo luscus*).
10. Elk or moose (*Alces malchis*).

7 and 8 are extinct since quaternary times. 9 and 10 are not so especially tundra animals as the others.

The student should note that though the presence of reindeer always indicates cold, it does not always indicate tundra conditions. In Magdalenian times at any rate there seem to have been various species of reindeer and those in western and southern France at the extreme southern limit of the extension of the reindeer seem to have been more the forest type corresponding to the North American species of to-day, and quite different from the true tundra-loving reindeer of the north which stretch down into the Alpine regions, and which were engraved so beautifully by prehistoric Man at Kesslerloch.

Some of the animals[1] *usually living under Steppe conditions.*

1. Jerboa (*Alactaga jaculus*).
2. Bobac or steppe marmot (*Arctomys bobac*).
3. Saiga (*Antilope saiga*).
4. Corsac fox (*Canis corsac*).
5. Wild horse[2] (*Equus caballus ferus*).
6. Wild ass (*Equus asinus*).

Animals characteristic of Warm conditions.

1. Cave lion[3] (*Felis spelaea*) } extinct.
2. Cave hyena[3] (*Hyaena spelaea*) }
3. Hippopotamus (*Hippopotamus amphibius*).
4. "Warm" rhinoceros (*Rhinoceros merckii*) } extinct.
5. "Warm" elephant (*Elephas antiquus*) }
6. Sabre-toothed tiger[4] (*Machairodus neogaeus* and *latidens*).

Besides these there are a certain number of animals the remains of which are found in quaternary deposits, living

[1] Only a certain number of animals useful to the study of Prehistory are given. For fuller accounts see chapter XI of *The Quaternary Ice Age*, by W. B. Wright.

[2] There were already a large number of different species of horse in Upper Palaeolithic times. This is attested by the various kinds of horse depicted on the cave walls. The multiple origin of our modern horse has been discussed by Professor Ewart in the *Transactions of the Highland and Agricultural Society of Scotland*, 1901.

[3] 1 and 2 arrived in France in warm Chellean times and existed till the cold period of the last glaciation.

[4] The sabre-toothed tiger became extinct at the end of warm Chellean times.

under various conditions of climate. Some still survive to-day, or at any rate existed till the Middle Ages.

1. Bison (*Bos priscus*).
2. Wild cattle (*Bos primigenius*), became extinct in the Middle Ages.
3. Stag (*Cervus elaphus*).
4. Fallow-deer (*Cervus dama*).
5. Roebuck (*Capreolus capraea*).
6. Giant deer (*Cervus megaceros*), now extinct.
7. Ibex (*Capra ibex*).
8. Chamois (*Rupicapra tragus*).
9. Brown bear (*Ursus arctos*).
10. Cave bear (*Ursus spelaeus*), extinct at the end of quaternary times.
11. Wolf (*Canis lupus*).
12. Fox[1] (*Canis vulpes*).
13. Rabbit[1] (*Lepus cuniculus*).
14. Weasel[1] (*Mustela vulgaris*).
15. Vole (*Arvicola*).
16. Marmot (*Arctomys marmotta*).
17. Birds (various species).
18. Beaver (*Castor fiber*).

It may be noted that while the same list of fauna could be used from early Mousterian to the end of Magdalenian times, the proportion of the animals varies, not only in the different ages, but also in the various areas where these ages are found. Thus, conditions were much more tundra-like in Germany, and near the Alps, than over the rest of France. As has been said there was probably more than one species of reindeer, and the remains of sweet chestnut and oak have been found at certain stages in the French Magdalenian age. This does not mean that conditions were not very cold, but they do not seem to have been both damp and cold, as was the case in the Alpine area in the neighbourhood of the hill glaciers. It is very rare to find any species of reindeer penetrating any latitude south of the Pyrenees. It may be mentioned that the bones of saiga, indicating a cold dry climate, are only found in the Upper Solutrean and Lower Magdalenian layers in France. Seal's bones are found twice in the Dordogne in the Aurignacian and Magdalenian layers; and the chamois is replaced in the Pyrenees by the izard, the

[1] 12, 13 and 14 are burrowing animals, and their bones are often more recent than the deposit.

two beasts being indistinguishable, except that in one animal the horns are parallel, while in the other they tend to diverge; the difference however is too slight for prehistoric art to be useful in determining which species we have to deal with, only the bones in the deposit being of any use for this purpose.

2. *The Relation of Man's civilisations to the Geological Divisions.*

As has been pointed out man-made objects are found in deposits that have accumulated in certain places. We therefore have to correlate the various earthy deposits containing human remains with the glaciations of quaternary times. Two different types of archaeological deposits occur, those in caves and those in open stations. The former more usually correspond to the times of extreme cold (beginning of Mousterian age to end of Magdalenian age), when the rock shelter, with maybe a rude wattle screen in front, provided a more effectual refuge from the climate. We shall see how both types can help us in the study of Man's relation to the glaciations.

Magdalenian. Most prehistorians are agreed as to the post-glacial character of the Magdalenian age. A number of stations occur along the western side of the Alps, inside the limits of the moraines of the fourth glaciation. It is obvious that if a deposit occurs inside the limits, or better still on a moraine, it must be later in date than the moraine. Such for example are the following stations (according to L. Schaudel and Tissot): Kesslerloch near Thaingen (Schaffhausen); Schweizersbild (near Schaffhausen); also (along the Rhône) Scé, Veyrier, Sous-Sac, les Hoteaux, la Bonne Femme, la Balme, Brotel, Béthenas.

In Magdalenian times it was however very cold, there being many reindeer bones in the deposits of this age. There was a short period in post-glacial times when the amelioration of climate was checked, and the ice began to re-advance. It is well-nigh certain then that the Magdalenian times coincided with this return of the cold known as the Bühl stage oscillation. The Magdalenian period continued to the end of quaternary times, when the reindeer was replaced by the

stag, and France was invaded by the Azilians, the forerunners of the Neolithic races.

As the relative chronology of the various ages to one another is known from the sequence of the superposition of deposits, the correlation of the Solutrean and Aurignacian eras would be fixed if that of the Mousterian was determined.

Mousterian. There are two localities where the correlation of the Mousterian age with the glaciations can be satisfactorily determined:

1. The cave of Bouchiéta (Ariège).
2. The cave at Cotencher (Neufchâtel).

1. The small cave of Bouchiéta opens half-way up the steep side of the Soudour, near Tarascon-en-Ariège. It faces up a side valley, a tributary of the main Ariège valley, and therefore must have faced the direction of approach of the glacier which joined the main glaciers of the Ariège valley just below Tarascon. According to Dr Obermaier the large glaciers of the Riss glaciation rose high enough to invade the cave, leaving when they retired a glacial deposit on the cave floor; while the glaciers of the last (Würmian) glaciation do not seem to have reached the cave, the upper part of the Soudour rising above the ice in the form of a Nunatak[1]. On the deposits left by the Rissian glacier on the cave floor is a layer containing Mousterian implements, which must therefore be post-Rissian.

2. The cave at Cotencher is 650 metres above sea-level, in the gorges of the Arense. It is over a mile within the extreme limits of the moraines, and 400 yards below the level of the last glaciation. It was examined by Stehlin and Dubois and the following deposits were observed:

Deposits at Cotencher.

(*a*) Intermittent stalagmite crust, replaced in the lower part of the cave by a thin layer of humus rich in roots.

(*b*) 60 centimetres to 1 metre of desiccated clay containing some pebbles towards the base.

(*c*) 1 metre 80 centimetres to 2 metres of a pebbly deposit constituted of various elements the nature and origin of which it has been impossible to determine, it being just earlier than the maximum of the last glaciation.

[1] A Nunatak is an isolated hill rising like an island out of ice.

(*d*) Brownish earthy deposit containing some very scattered pebbles, and nests of phosphate of chalk concretions. This deposit is a metre and a half thick, and in the bones collected the following species have been recognised:

Myotis spec. (*c*).
Eliomys spec. (*d*).
Arctomys marmotta (*d*).
Arvicolides, 2 to 3 kinds (*c*).
Mus spec. (*c*, *d*).
Cricetus cricetus (*d*).
Cricetus spec. (*d*).
Lepus spec. (*c*, *d*).
Felis spelaea (*c*).
Felis pardus (*c*).
Felis catus (*c*).
Lynx lynx (*c*).
Vulpes spec. (*c*, *d*).
Canis lupus (*c*, *d*).
Ursus spelaeus (*c*, *d*).
Foetorius arminea (*d*).
Sus scrofa (*c*).
Ox (*c*).
Rangifer tarandus (*c*, *d*).
Rupicapra rupicapra (*c*).
Capra ibex (*c*).
Equus caballus (*c*).
Birds, 4 or 5 species (*c*).

[The letters indicate the layers in which the animals were found.]

More than 95 per cent. of the bones belonged to cave bear. The (*c*) layer produced about 100 stone implements of Mousterian type, exactly similar to those of Wildkirchli. These discoveries interest us from three points.

It is the first time that we learn the Jurassian fauna of cave bear times.

It is the first time that a Mousterian station is discovered in the Swiss Jura.

Lastly, it is the first time that a Mousterian deposit is found below the moraines of the last glaciation, and in close relation with a glacial deposit[1].

The first of these cases demonstrates the post-Rissian character of the Mousterian age; the second demonstrates its connection with deposits of Würmian age. The arctic character of the usual Mousterian fauna suggests a decided connection with a glaciation.

It may be asked how it is that the deposits at Cotencher were not completely scoured out at the period of the maximum elevation of the Würmian ice, when the cave was under the level of this ice. It may be noted, as was pointed out to the writer by Professor Marr, that deposits can be boxed and frozen into a cave, and then unless the cave happens to face an advancing mass of ice which would enter and scour it out, there is no reason why the deposits should not remain undisturbed, until the overlying ice disappears and the deposits thaw.

[1] See bibliography, Stehlin.

Acheulean. The terraces of the Garonne of this age have already been mentioned. They were studied by Obermaier in 1905, and the following is an extract of a letter to the writer:

> The Acheulean deposits of Fonsorbes, Cambernard, Saint-Clar, etc., are found *on* the fluvioglacial gravels of the third terrace, but never *in* the gravels themselves, except occasionally in the clay which caps these gravels.

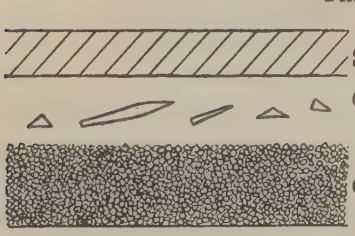


Fig. 3.

This Acheulean deposit is in consequence more recent than the fluvioglacial gravels and therefore than the third glaciation. Note that we are dealing with fluvioglacial gravel formations where ice was no longer present.

As large nodules of flint are rare in the Garonne valley, Acheulean and Chellean Man of this region made his tools from a peculiar kind of hard quartzite river pebble. As this material does not lend itself to the making of well-made tools, though they are obviously Lower Palaeolithic it is difficult to be more precise about their date; but these quartzite tools can be traced north till they become associated with Palaeolithic flint implements. The fauna associated with the implements is a sufficient guide as to whether or not a deposit is of Chellean or Acheulean age. In France the former is always found with a warm, and the latter with a cool or mixed fauna.

Another interesting find is that of a *coup-de-poing* of Lower Paleolithic age found near Conliège, five kilometres S.E. of Lons-le-Saulnier, Jura. It was discovered near the road that runs from Conliège to Briod, in a matrix of stones in clay, resting on the bed rock of the plateau. This district is well within the limits of the moraines of the third glaciation, though untouched by the fourth. Now this matrix of

Conliège when in superposition is on the moraine of the third glaciation; therefore the implement found on it must be later than the third glaciation. Here again, then, we find that the Lower Palaeolithic age is post-Rissian.

An exactly analogous find came from the right bank of the Ain near the Château of Bohan. It was found in an alluvium of the same age as the Conliège matrix, under which the moraines of the third glaciation are found intact. Both these implements are chipped out of the same material, the one at Conliège was found comparatively recently, the Bohan specimen being an old find, for which cause doubts have been cast on it. There seems however very little question that it is genuine, as the finders, M. Tardy and M. Arcelin, were both skilled Prehistorians. At any rate it is strongly supported by the later find of Conliège.

The relative chronology of the various ages is determined by the superposition of beds containing deposits, so with fixed points for the Magdalenian, Mousterian, and Lower Palaeolithic ages the following chronology results:—

Azilian. At the limit between the Quaternary and the Recent age, when the climate was becoming like that of our own day.

Magdalenian. From the Bühl stage upwards to the commencement of the Azilian.

Aurignacian-Solutrean occurring between the Magdalenian and the Mousterian, i.e. contemporaneous with the Achen recession of the ice, still very cold, but slightly less so than the Magdalenian age.

Mousterian just previous to the maximum of the Würmian glaciation, and as we shall see from the English evidence probably straddling right across the glacial period.

Chellean and *Acheulean* correspond to the warm Riss-Würm inter-glaciation. In the Acheulean era, a rather later date, it is slightly cooler, as the cold of the oncoming fourth glaciation is approaching. All industries older than Chellean are known as Pre-Chellean; these occupy the time between the Chellean and late Crag industries of East Anglia[1]. With Boule's system of three glaciations, this would not involve a

[1] In England Pre-Chellean times include bottom of the mid-glacial, Cromer Till, Forest Bed, and Chillesford Bed times.

very long period, and even if we follow the fourfold system of Penck, it may well be that his first inter-glacial period was of no great length or importance.

Let us now turn and see what evidence we can glean from the Amiens district of North France.

In the Somme valley there is also a series of river terraces, but they differ in three main respects from those of the Garonne.

A. Being right away from glaciations they are of purely fluviatile origin, the effect of glacial periods merely being to absorb moisture from the air for the formation elsewhere of glaciers, and so to prevent precipitations, thus causing the stream to dwindle; the opposite of course being the case in inter-glacial times.

B. Whereas in the Garonne valley the differences in the heights of the various terraces are very considerable, being in some cases more than 50 yards, in the much flatter country in the north of France these heights are much less, being more nearly 20 yards.

C. In the north in quaternary times there was considerable elevation and depression of the land, with corresponding invasions of the sea. This variation in the level of the land has obviously a direct bearing on the terraces, as elevation of the land would increase the slope of the river, thereby increasing its eroding power and vice versa. Certain of these gravels in the Somme valley contain implements; and all the terraces except the bottom one (which is itself divisible into two at slightly different heights) are covered by a wind-borne deposit known as the older loess. As this deposit occurs on the lowest but one, and not on the bottom terrace, it must have been laid down before the river had cut its way through to the bottom terrace. Lower Acheulean implements are found in the older loess associated with the bones of *Elephas antiquus*, big horse, stag, etc.; and Upper Acheulean implements in the upper part of the older loess with the bones of *Elephas primigenius*, *Rhinoceros tichorhinus*, little horse, bison, etc., but no reindeer. This older loess, and this time the bottom terrace also, is overlaid by a similar deposit known as the "younger loess." As this is found on the bottom terrace it must be later than the last glaciation,

and probably belongs to the dry steppe period that followed immediately after. At the base on the second terrace are found Lower Mousterian implements with *Elephas primigenius*, *Rhinoceros tichorhinus*, little horse, bison, etc. In the middle of the loess are found Upper Mousterian implements, with *Elephas primigenius*, *Rhinoceros tichorhinus*, and reindeer. Aurignacian implements occur in the two top yards of the loess, while typical Solutrean ones are found at the surface. Neither of these loesses are homogeneous throughout, each can be divided into three layers. These loesses can be correlated exactly with those occurring in the valley of the Rhine, and these in turn can be traced upwards till they come into contact with the actual glacial material of the Alps. According to M. Haug the younger loess of the Rhine valley rests on the alluvium of the bottom terrace in direct relation, near Bâle, with the fluvioglacial alluvium of Würmian age. There also the older loess of the Rhine valley rests on the alluvium of the second terrace in direct relation with the fluvioglacial terrace of Riss age. It is therefore later than the Rissian glaciation.

The problem of the Somme valley is further complicated by alterations in the height of the coast. Marine shells were long ago recognised by Prestwich as occurring on the second terrace at Menchecourt; there are also two series of dunes following the coast, an outer range corresponding to the sea-level of to-day, and another considerably further inland, formed at a time of coastal depression. Again, the duplication of the bottom terrace has to be explained. The upper portion of it, more or less on a level with the valley floor to-day, contains the remains of *Elephas antiquus* and Upper Chellean implements; while the bottom portion, below the modern sea-level, contains *Elephas primigenius*, and as regards implements only quite late Acheulean and early Mousterian. The valley at that time was in relation with the submarine valley of the English Channel, where, in dredging, the bones of mammoth have been found. The following seems to be the epitomised history of the Somme valley. In early times the Somme drew most of its waters from far away in the Ardennes, as is witnessed by the occurrence of Ardennes quartzites in the top terraces. These head-waters

were captured by the Oise, the Somme becoming correspondingly smaller. Whether or not this had any influence in the formation of one or other of the upper terraces cannot be decided; but at any rate our main interest in this study begins with the third terrace counting from below. This corresponds to Penck's Mindel times or part of Boule's first glaciation. It contains implements of a Pre-Chellean type. At Amiens there seems to be practically no fauna, but at Abbeville the deposits contain a fauna very similar to that of the lower part of the Cromer forest bed, such as *Elephas meridionalis*, *Rhinoceros etruscus*, *Rhinoceros leptorhinus*, *Hippopotamus major*, *Trogontherium cuvieri*, *Equus stenonis*, *Cervus solithacus*, *Machairodus*, etc. It will be seen, however, that unless certain gravels that occur in the Cromer Till and Contorted Drift are the slight remaining indications of an inter-glacial period in the middle of these deposits of Mindel-Riss age, this third gravel terrace at Abbeville was probably older than the forest bed. There is an indication of duplication in this terrace, probably due to alteration in the land-level. Then the river cut its way down to the second terrace which was deposited during, and just after, Rissian times. The bottom part of the gravels contains Pre-Chellean implements which the river sands deposited; then the river cut down to the next terrace where typical Chellean tools are found. As fauna we have *Elephas antiquus*, *Elephas primigenius*, big horse, big ox, stag, etc. The similarity of industries and fauna in Great Britain would seem to indicate that the Straits of Dover did not exist at that time. Some time after the Somme had been cutting its way down to the bottom terrace, the land sank, and the sea invaded the coast. A similar depression of similar age has been recognised by Dr Marr in the fen region round March.

The Somme was thus ponded back, and the upper portion of the bottom terrace was laid down. A rise of land in Würmian times caused the water to cut its way down to a new low level, the lower portion of the bottom terrace. A further sinking of the land in post-glacial times re-opened the Straits of Dover, and led to a great deposition of peat in the Somme valley, under which Magdalenian implements are sometimes found, and over which the Somme now flows.

Various layers of this peat have yielded Neolithic implements, others those of the Bronze Age, and others Iron Age tools.

Thus again we find that the Aurignacian era is clearly post-glacial, the Mousterian in close relationship with the end of the fourth glaciation, while the Chellean and Acheulean are of Riss-Würm age, and the Pre-Chellean dates from still earlier quaternary times.

Crossing over to England we find ourselves in a considerable difficulty, and this time instead of our deposits dating our implements, our implements must be the fossils to date our deposits. There are several localities to be discussed, two, of great importance, being in East Anglia.

Cromer. The first locality is in the cliffs near Cromer, where a very fine Acheulean *coup-de-poing* was found in gravels ying on the Cromer Till. Clement Reid thought these were valley gravels, but local observers are certain of their glacial origin, especially now that the cliffs are cut back and better sections exposed. Whether these gravels are valley or not does not concern us at the moment, but what is important is, that they are resting on and therefore newer than the Cromer Till and therefore the implement that they contained is also newer than the Cromer Till.

Foxhall road. Again in the neighbourhood of Foxhall road, near Ipswich, a remarkable section was exposed some years ago. At the bottom was an obvious glacial boulder-clay, then followed a series of sands, of a different aspect but possibly corresponding with part of the mid-glacial gravels of Bolton and Laughlin's pit, Ipswich. Possibly some of the rough implements collected by Miss Layard at the Foxhall road site correspond to those of Chellean or Pre-Chellean date found by Mr Moir in the Bolton and Laughlin mid-glacial gravels. At any rate above these there came a series of deposits containing fine Acheulean implements, corresponding in workmanship to that mentioned above as found at Cromer. Above these deposits containing Acheulean implements came a highly contorted deposit obviously due to a glaciation.

It would seem that at Foxhall road (sometimes known as Derby road) we have a more complete section, whereas

on the Cromer cliffs we have only gravels corresponding to the Acheulean portion at Ipswich.

The underlying deposit at Cromer is Cromer Till, therefore it may be presumed that the underlying stratum at Ipswich is also Cromer Till[1]. The upper glacial beds at Foxhall road therefore compare with Chalky-Boulder-clay, and are the last glacial deposit to be found at Ipswich. The evidence is therefore clear that in East Anglia at any rate the Lower Palaeolithic is to be found between the Cromer Till and Chalky-Boulder-clay; and as the latter is the last manifestation left by the Ice Age in these regions—being probably of Würmian age—we find that the evidence corresponds closely to that already found in France.

Ipswich. At Bolton and Laughlin's pit near Ipswich, situated in the side of a small valley, above the Red Crag, which here rests unconformably on older beds, there lies a large thickness of so-called mid-glacial sands, having at their base boulders, some of foreign origin and probably indicative of a glacial period. These gravels are very poor in industries, but those that exist point to Lower Palaeolithic times with a Mousterian tendency towards the top. At the top of these sands is a thin band of loam passing up into Chalky-Boulder-clay. This deposit has yielded one or two implements which may well be of Mousterian age; the implements found actually in the Chalky-Boulder-clay were in all probability ploughed up from the underlying loam, and, as in all glacial deposits, there are a number of flakes, due to mechanical and thermal action.

At the bottom of a little valley occur two archaeological floors, between which a peat containing a modern temperate flora is to be found. These floors have long been held to be of Mousterian and Aurignacian age respectively, opinion being largely influenced by the fact that a bone from the lower deposit had been determined as that of a mammoth. The occurrence of peat with a modern temperate flora, and the fact that pottery occurs in the lower deposit, have always been difficulties. Breuil, however, in a recent visit, suggested that the bone was not that of a mammoth but of a whale, and that typologically the industries agreed closely with the rather peculiar early English Neolithic of Essex. Here as can be seen in Mr Hazzledine Warren's collection, the industry

[1] See Addendum note p. 60.

includes an occasional Campigny axe, microliths and pottery, and is found in proper stratigraphical sequence.

Certain low terrace gravels of the river Gipping near Ipswich contain a poor Mousterian industry with the remains of reindeer, above which is a poor Upper Palaeolithic and some Neolithic on the top. Upper Palaeolithic implements were also found in a digging in Ivry street, Ipswich, but there was nothing at this place to help us correlate the finds with definite geological ages, nor can the finds themselves be assigned to a precise date.

Biddenham, near Bedford. Another classical locality where sands and gravels of Chellean age occur is at Biddenham. The river Ouse has cut its valley in Jurassic rocks (Oxford clay and cornbrash), the valley itself being filled with gravels. The river has cut through these down to the cornbrash, and the bottom gravels have yielded Lower Palaeolithic implements. The upper portion contains a certain amount of material derived from the Chalky-Boulder-clay which covers the whole surface of the surrounding country. The early explanation was, that the sands and gravels were of post-Chalky-Boulder-clay age, being deposited by the Ouse after it had cut through and removed the Chalky-Boulder-clay from its bed. In the light of what we have already seen, the probable explanation is that the Biddenham gravels are true mid-glacials, that is, earlier than the Chalky-Boulder-clay, and that this latter material when it was deposited, sagged into the valley, and rested on the gravels. As a result of this sagging into the valley, the post-glacial drainage of the Ouse was the same as before, and since Chalky-Boulder-clay times the river has removed the Chalky-Boulder-clay cap from its valley, mixing some of the material with the top of the gravels, and has then cut its way rapidly through the soft gravels to the cornbrash. This does not indicate any very long period of time.

Hoxne, Suffolk, was first scientifically examined by Prestwich and later by a committee under Clement Reid.

The following is a section of the deposits:

(*a*) Sand and loam; (*b*) black loam with arctic plants (*Betula nana*, *Salix polaris*); (*c*) lignite; (*d*) lacustrine clay, with temperate plants (*Alnus glutinosa*, *Rosa canina*); (*e*) chalky-boulder-clay.

The implements seem to be of two kinds, typical Acheulean, *coups-de-poing*[1], etc., and some of Mousterian age. Kennard has pointed out that according to Prestwich's report, the implements came from below the Arctic bed, while according to Clement Reid's report, they came from the loams above. Is it Acheulean below, Mousterian above? There is nothing to tell whether the boulder-clay is of Cromer-Till-Contorted-Drift age, or of the later Chalky-Boulder-clay age. Should it be the former the Arctic bed would coincide with the Chalky-Boulder-clay elsewhere, and the section agree with that of Ipswich, except that at Hoxne we have a rich Acheulean industry present, an industry which is poor and rare in the mid-glacial sands at Ipswich.

Cambridge. The section at the Traveller's Rest pit, near Cambridge, which has been studied by Dr J. E. Marr yields the following deposits. Resting on the gault is a thick series of evenly bedded sands, having at the base ice-scratched blocks of sandstone, etc., indicative of a glaciation. These sands contain a certain number of Lower Palaeolithic *coups-de-poing* with an ochreous patina. They are succeeded by a series of contorted sands, that contain a few implements of a bluish patina of a late Acheulean or early Mousterian type, such as tiny *coups-de-poing*, and a few poor Levallois flakes. On this rests a loam often folded into the top of the underlying contorted sands. This loam recalls the glacial loam at the base of the Chalky-Boulder-clay, and the whole contortion seems to indicate another glaciation. On this glacial loam rests a series of evenly bedded sands which up to the present have yielded no implements, but close by in another field a loam, probably of somewhat similar age (at any rate later than the glacial loam of the pit), has yielded a few Aurignacian implements. This section and that in the Bolton and Laughlin pit Ipswich coincide, except that in the former the Chalky-Boulder-clay itself is absent. This Traveller's Rest pit is about 90 feet above sea-level.

Certain loams at the base of the gravels at Barnwell, and in a pit on the Milton road, contain *Corbicula fluminalis* and a warm fauna. A *coup-de-poing* was described in the *Geological Magazine* in 1878, page 400, as coming from Barnwell. These deposits are probably Chellean, being more or less of

[1] See Plate I, 1, 8.

the same age as the bottom gravels at the Traveller's Rest pit. The loams would seem to be older than the overlying terrace of gravel at the Milton road pit, the difference in their heights being due to the depression of the land in Chellean times, and the subsequent elevation that so altered the Cam drainage in the flat regions of East Anglia[1].

Elsewhere in the Cambridge district on the Essex side there are a series of gravels underlying the Chalky-Boulder-clay; up to the present, man-made objects are very rarely found in them, but it seems likely that they are to be correlated with the mid-glacial sands of the Traveller's Rest pit.

These gravels occur at about the 200 foot contour line. This does not, however, present a serious difficulty, for the Traveller's Rest gravels would naturally be expected to be at a lower level, being much lower down the ancient river valley. On the other hand, certain deposits occur on the top of the Gogmagog hills, only four miles or so from the Traveller's Rest pit, and it would seem that these deposits which are of unknown age and have yielded nothing in the way of implements, cannot be correlated with those of the Traveller's Rest pit. The top beds are manifestly the result of glaciation for they contain fragments of the red chalk from Hunstanton. Below occur a series of fine sands with, rarely, some thin laminae of peaty material. But the problem they raise still awaits a satisfactory solution.

The Aurignacian loam of later date than the Chalky-Boulder-clay near the Traveller's Rest pit has already been mentioned. Of probably somewhat similar age are the newer Barnwell village gravels and at a lower level than these are to be found what are known as the Barnwell station gravels. These latter can probably be exactly correlated with the Ponder's End deposits described some years ago by Hazzledine Warren in the *Quarterly Journal of the Geological Society*, although certain differences in the flora can be noted.

There are but few objects of human origin, and these seem to be of Upper Palaeolithic type; the fauna is arctic, including the remains of reindeer. This indicates a return of cold conditions without actual presence of glaciers. Surely

[1] The whole deposit at Traveller's Rest indicates a time when the Cam drainage ran at right angles to its present course.

we can compare this with the Bühl oscillation of Magdalenian times when the reindeer roamed as far south as Mentone. Perhaps, though this is merely theory, we can correlate these cold deposits with the latest drift at the Cae Gwyn caves, in North Wales, the ice in this district having reached sufficiently far south to deposit an actual glacial Drift. In the region of the high-level gravels already mentioned, there is one locality at Rivey Hill, near Linton, where gravels of later date than the Chalky-Boulder-clay are found. These have yielded to Mr Maynard (now of the Ipswich Museum) a few rough untypical implements possibly of early Aurignacian age.

Thames valley. Before considering the Thames valley deposits, the student may be reminded of the alteration in the level of the land which took place in Palaeolithic times.

Dr Marr has demonstrated a partial subsidence of East Anglia in post-Chellean times. This corresponds no doubt to the subsidence of similar date in the Amiens district.

The alteration in the level of the land has played an important part in complicating the chronological problem in the Thames valley. There appear to be two main terrace groups of gravel; the upper one ranging about the 100-feet contour line, whilst the other is roughly from 50-feet to Ordnance Datum. It should always be remembered that unless alteration in land-level is very rapid, terraces formed at different moments of land movement would not be of exactly the same height above Ordnance Datum; and it is only after a rapid change in the levels that terraces show such a difference of level as to be classed into a definite upper and lower series. Thus all the upper terraces are not exactly at the 100-feet contour, nor are all the lower terraces at O.D.; but there is a distinct gap of about 90 feet or so between the two sets of terraces.

The gravels of the high-level terrace were deposited when the land was some 100–150 feet below the level of the land to-day. They contain Lower Palaeolithic implements, Chellean and Acheulean, and rocks foreign to the Thames valley. Is the presence of these rocks due to the Rissian ice age, that is to say to Contorted Drift times? This depression is probably the same as that which lowered the level of East Anglia just after and during Chellean times. At one place,

between Upminster and Romford, gravels of this series rest on a patch of boulder-clay. This has been spoken of as Chalky-Boulder-clay, but it may well be questioned if it is not rather an outlier of the Contorted Drift, the main mass of which has been ploughed up and destroyed in these southern districts by the succeeding Chalky-Boulder-clay. An excellent place to study the upper terrace gravels is at the Wansunt pit, Crayford, and at Swanscombe.

The deposition of these upper terrace gravels was followed by an uplift of the land, whereby the Thames cut its way down, and at one point in the pit there is the filled-up channel of some tributary river from the south that had cut through the top layers of the gravel, and graded to the sinking Thames below.

This channel is filled up with clays that have yielded Acheulean and early Mousterian implements[1]. At the end of the uplift the second terrace gravels were deposited at about O.D. These can be seen at Grays, Ilford, Crayford, etc. Grays would seem to be slightly earlier in time than Ilford, and Crayford is the most recent of the three. These Crayford gravels contain Acheulean and Mousterian implements and a mixed fauna, there being the remains of mammoth, though at the same time walnuts occur. This terrace seems to correspond to the top portion of the bottom terrace at Amiens. The deposit of fine bedded brick earth at the top of the gravels may be due to the blocking of the North Sea by the ice of the last glaciation, and the consequent ponding back of the Thames waters to form a sort of lake. In some places a deposit called the "Trail" rests on the top of these Crayford gravels. According to Chandler this is composed of local material derived from higher ground near, it having crept down in the form of slush on to the lower levels.

An uprise of some 120 feet followed, at which time the Thames cut its way down to the bottom of the so-called buried channel; this channel corresponds to the similar buried channel at the bottom of the English Channel, and to the buried channel at the bottom of the Somme at Amiens (buried bottom gravels of the bottom terrace).

A sinking of the land to the extent of some 100 feet

[1] See Bibliography, Chandler, 1912–14.

followed, and this buried channel was filled up with peats or forests. There are three of these layers of peat separated sometimes from one another by a deposit of tidal silt, containing *Scobicularia piperata*. The lower of these peat layers seems to be of purely Neolithic age; the middle of Neolithic and Bronze Age; while the upper layer formed the marsh of Roman times. Continued subsidence of the land is indicated by a further deposit of clay some five feet thick, on the uppermost peat.

Oxford. The gravel terraces near Oxford seem also to fall into two main groups, probably similar to the ones near London. As in the latter region the Oxford gravels of an individual terrace are not all of exactly the same height above O.D.

Farnham. In the Farnham district there are also terraces containing Lower Palaeolithic implements. These terraces, also, are partly due to climatic changes, and partly to changes in the level of the land.

To repeat the story, in England we seem to have Chellean gravels laid down on the remains of the Rissian glaciation, the southerly limit of which is uncertain owing to the subsequent removal of its remains, partly by denudation, partly by the fourth glaciation. These mid-glacial gravels were succeeded by the Mousterian age, in Chalky-Boulder-clay times (Würm), when the ice reached the outskirts of London, and deposited there its terminal moraine. This is by no means an unlikely extension of the fourth glaciation, in the latitude of Gt. Britain. In Aurignacian times, the ice retreated north, and then re-advanced in Bühl-Magdalenian times, when it probably reached the North Wales caves, depositing its drift there, though not extending as far south as Cambridge. Whether or not the Hessle Boulder-Clay mentioned in the last chapter is of this age, or, as has been suggested, merely an equivalent of the Chalky-Boulder-clay east of the Lincolnshire wolds, is uncertain.

Two notes may be of interest:

1. Whether or not Magdalenian Man really reached England (except perhaps in the south-west) is not absolutely certain. He is not found at Paviland[1], South Wales, and it

[1] See Bibliography, Sollas.

may be that we must merely look for developed Aurignacian implements similar to those of Mentone.

2. Certain industries of small implements from near the surface in the Cambridge and Thetford districts, Hastings, and Sevenoaks, from close to the surface in North Cornwall, and from below the peat in certain parts of East Lancashire, may be of transitional or Azilian date. There is no objection to this from a stratigraphical point of view.

Finally, the reader may enquire: Have we any idea of the actual age in time of these several Cultures? Various attempts have been made to arrive at some conclusion, to find for example, the actual date of the last glaciation. Thus, A. Heim concluded that the ice had vanished completely some sixteen thousand years ago. He based this estimate on the present rate of growth of the delta deposited by the Muotta in the Lake of Lucerne.

A more exact method has been devised by Baron de Geer[1] of Upsala, who has actually counted the number of layers of sediment which the ice of the fourth glaciation deposited in the sea during its retreat. These sediments were deposited during the summer thaw, and they cover Scandinavia from south to north, like tiles on a roof. Each of these little layers of sediment corresponds therefore to one year. They are by no means of the same thickness, and some of them have special peculiarities. By this means individual layers can be recognised in various diggings, and when a series of pits are dug from south to north in Scandinavia, those layers in the top of a section in the south can be recognised at the bottom of a section further north. By this means their total number can be obtained which gives us the period taken by the ice to retreat from South Scandinavia to the north. The number is about 5000, and therefore the retreat took about 5000 years. Fortunately these layers continued to be deposited up in the north, in Lake Ragunda, from the moment that it was uncovered by the retreating ice. This lake was drained about the middle of the last century, and the number of layers there was about 7000. The number of years therefore from our own day to the time when the ice was in South Scandinavia is 7000 + 5000 = 12,000 years.

[1] Attempts have been made to disprove de Geer's method.

The southern limit of the fourth glaciation ice was further south, in North Germany, and is marked by the inner terminal moraine called the Baltic ridge. The distance from this to the south coast of Scandinavia is about half the distance covered by the ice in its retreat over that country. We should therefore expect to add half the time taken to do this retreat or 2500 years. However the rate of retreat of the ice is by no means uniform, it increased as the ice retreated north, for instance at Stockholm the retreat was five times as quick as in South Scandinavia. Professor Sollas suggests that another 5000 years should be added, instead of 2500, making an interval of 17,000 years between us to-day, and the beginning of the retreat of the ice of the last glaciation.

Man cannot have arrived in South Scandinavia till the ice had left, i.e. 12,000 years ago. The first civilisation (Maglemose) of this region is probably of the same age as the Azilian of France, the migrations of both being due to pressure from the east. The provisional age of the Azilian may thus be taken at about 10,000 years B.C.

The Mousterian age, as we have seen, straddled across the last glacial period the end of which was some 17,000 years ago, and between these dates we have ample room to fit in the Aurignacian (a long period), the Solutrean (a short period), and the fairly long Magdalenian age, which latter in France had such an amazingly flourishing art.

ADDENDUM.

It should be remembered that the views expressed above with regard to the relationship of various Palaeolithic divisions to the glacial period are by no means generally accepted by British geologists. Many acknowledge only one period of glaciation, some considering Man as having existed in pre-glacial times, others regarding him as wholly post-glacial. But all recent investigation tends to demonstrate the poly-glacial theory and points to the conclusion that Palaeolithic Man and his precursor lived in England before, during, and after glacial times.

ADDENDUM NOTE to p. 52.

The lower Boulder-clay at Foxhall road is blue in colour and unlike the Cromer Till in appearance. It occurs at one place in Bolton and Laughlin's pit and may be merely a local variety of the Till. The relationship of this drift to the Cromer Till and the mid-glacial sands and gravels is, however, unknown, and it may possibly turn out to be the remains of another drift, intermediate in age between the Chalky-Boulder-clay and the Cromer Till. Superposition with the mid-glacial deposits may show that a part at least of the latter are a good deal older than has been believed.

CHAPTER IV

FLINT, FLINT FRACTURE AND PALAEOLITHIC TOOLS

The Palaeolithic tools that survive to our day are made of:

1. Stone or flint.
2. Bone, horn or ivory.

There may have been, there probably were, implements made of wood and other perishable material; of these of course we have no trace.

Stone.

Man used stone for his implements in all ages, when the more easily worked flint was not obtainable. In Neolithic times, when he had learnt to polish his implements, he frequently preferred a hard tough igneous rock to the more brittle flint. In older times, however, chipped implements of stone, even of chert or quartzite, are seldom characteristic, as the material does not lend itself to delicate work, and such implements are therefore of very little use for a typological study.

Flint.

Flint is a varying mixture of crystalline and amorphous silica. It is brittle, fractures easily and lends itself to the manufacture of delicate tools. It must therefore be our business to discuss shortly this material, and its habit under the influence of blows.

Natural flint occurs in bands or layers at several horizons of the Cretaceous Chalk. It used to be supposed that its formation was always due to marine organisms. In order to manufacture their sponge spicules, sponges are known to segregate silica from the water. Later, it was thought that silica replaced part of the chalk containing these organisms, thus forming flint nodules. Again it was demonstrated in the "Porcupine" exploration of 1869, that water under pressure dissolves more carbon di-oxide, thus more rapidly dissolving

carbonate of lime in the form of bi-carbonate. The higher the temperature of water the more silica in solution it will carry. Thus an increase in temperature and pressure of surrounding water would produce conditions suitable for replacement of part of the calcium carbonates by silica. This no doubt is another of several causes of the formation of flint.

As the late Professor Hughes pointed out, this theory does not explain the banded nature of flint in the upper beds of the chalk, there being none in the lower more deeply depressed levels, though silica exists in the lower levels, and sometimes replaces shells even in the lowest tertiary beds. Flint assumes various natural forms, being sometimes tubular, often with branches, sometimes tabular with two flat parallel sides, etc. As has been said, in chemical composition it seems to be formed of a mixture of crystalline and colloidal silica; the proportions vary in quantity and the general formula seems to be SiO_2xH_2O. The water contained in the flint slowly dries up on exposure, thus the flint near Cambridge on being first extracted is brittle, but on drying becomes black and tenacious. This drying process probably produces the so-called patina, or weathered skin, often found on flint. Where there has been a slight admixture of iron earths, a fine lustrous ochreous tinge is often given. Where there has been no admixture with iron and the flint is plain black, as it is near Brandon, the patinated surface is dead white. Half patination produces a mottled surface of black and white, or a general bluish appearance. As patination seems to be due to some sort of drying process, it is perfectly obvious that it entirely depends on surrounding conditions. Two implements made by prehistoric Man on the same day and dropped in different positions may be found to-day in completely different stages of patination. It even happens that the two halves of one and the same implement which has been broken are found close together differently patinated; and even the top and bottom surfaces of the same implement are sometimes dissimilar. The latter state is common in the implements found at Three Hills, Suffolk, the side of the implement nearest the surface of the soil being more heavily patinated. It is therefore at once apparent

that patination is of very little use (except in a general way) for demonstrating the age of any particular implement. However it is often useful in local areas as various layers of the deposit may contain flint implements of different patination[1].

It sometimes happens that an implement made in one period was found and re-made by a man in a later period. This we can demonstrate by observing that the patina on one set of worked flakes is different from that on another set, therefore the sets were made at different times.

Fracture of Flint.

A. *By percussion.* Flint is a very brittle substance and behaves in a peculiar manner when it receives a blow. If an ordinary homogeneous piece of flint is struck with a large round pebble, the actual point of contact is small and the force of the blow is localised at this point. To quote Professor Hughes in a paper read before the Cambridge Antiquarian Society:

> The flint pressed in and shattered, breaks in flakes so thin that the edges may be regarded as leaving a curved surface, which, when the shattered part has been removed by the weather, appears as a shallow basin, while a conical nipple with an apex of (somewhere about) 110° often remains under the discoidal area when the action of the weather has not entirely removed this portion also.... If however the blow be sufficiently strong to break up the flint, and we might regard the action of the hammer as punching out a portion of the flint, then the nipple described above "behaves with" the hammer, and drives out a conical mass which if prolonged would have an apex of 30°, so that the result is a long narrow cone truncated by a short broad cone with a more or less sharply-defined shoulder between the two.... If the blow be delivered on the margin of a flint a slice only of the cone on cone, or double cone, is struck off, producing a flake, a part of the truncating cone being seen in the bulb of percussion, some of the small discoidal surface of contact between the two elastic bodies being generally apparent. The direction in which the blow has been delivered is shewn by the outward curve of the conchoidal fracture.

Thus it happens that if a flake is taken off, whether it be great or small, either the flake or the core has on it a swelling, whilst the other has a depression. The swelling is known as "the cone of percussion" and the hollow as the "negative cone of percussion." It is only under exceptional circumstances that this swelling resolves itself into the two cones.

[1] See note on p. 78.

The point of impact is often surrounded by concentric curves that cover the bulb of percussion. These correspond to the ripples in water when a stone is thrown in, the cone of percussion being the place where the stone strikes the water. They are known as ripple marks, and it should be noted that the point of impact of the blow must necessarily be on the concave side of these ripple marks. Sometimes lines radiating from the point of impact cut through the ripple marks; these lines are called fissures. It occasionally happens that a small flat scar is observable on the cone of percussion, due to the removal of a small flake; this is known as an "éraillure" and seems to have been removed by the same blow as formed the cone of percussion. The "éraillure" is sometimes seen on flakes removed by pressure and not by percussion. If a flat surface of flint is subject to a series of blows by a moving body, the surface will be found to be covered by a number of small marks; these are in reality incipient cones of percussion, and a careful study of the ripple marks, etc., will give an idea of the direction from which the blows came. Nature is perfectly capable of fracturing flint by percussion, but the direction of the blows are usually fortuitous; in the work of Man, the blows are obviously not haphazard. Man early discovered that to make any form of implement it was necessary to find a piece of flint, not too thick, with parallel sides. This as we have seen occurs naturally and is called tabular flint. If however Man could not find it, he made it by taking a spherical mass of flint, knocking off both top and bottom portions, when the centre gave him his tabular flint with parallel sides. Next it was imperative to have a flat surface on which the necessary blows were to be given; this was known as a striking platform. If no such flat surface occurred naturally Man made it by a series of blows at right angles to the direction of his main blows. The discovery of these artificial striking platforms is very useful in the determining of the value of certain doubtful specimens, serving as a test as to whether or not the implement is of human manufacture. The direction of the main blow on the striking platform may be inwards, outwards, or along the flint. In the first case there is produced what is known as "resolved flaking," the flakes are small and

a succession of small broken ridges is produced in the surface of the flint. In the second method long flakes are struck off and a "feather edge" left, the flint being planed, as it were, by the blows, without any very definite ridges between the surface of the face produced and the original surface of the flint. In the third method small short flakes are "bitten" out of the edge. In natural formation the first and third methods are very much more usual than the second, and in fact on finding the second one can be fairly sure that human agency has been at work. Ripple marks are far more noticeable and intense in resolved flaking than in feather edge flaking. While long flakes or blades are being struck off a core, vibrations transverse to the blow itself are set up in the flake or blade, thereby snapping it. As certain civilisations however manufactured extremely long blades by percussion, it would seem that they did so by binding the core round with skin or burying it in the sand, thereby nullifying the vibrations set up in the thin blade which they were about to take off.

Having blocked out the implement in the rough it had then to be finished with what is known as secondary working or trimming (French, *retouche*). The direction from which the blow came, which made the flakes, can be determined by observing the ripple marks on the various flakes with a magnifying glass, if these have not been too obscured by subsequent patination. Even if most of the flake scar has been removed by a subsequent re-trimming there is usually enough evidence left to determine the direction of the original blow. In this way charts have been made showing how Man manufactured the implements, and the manner and direction in which he struck the various blows[1].

It occasionally happens that the broken edge of a flint, instead of being flat with sharp edges, is rounded off; this is known as hinge fracture.

B. *Thermal* (*heat and cold*) *fracture*. Changes in temperature produce fracture in flint, owing to the fact that it is not entirely homogeneous and expands and contracts in different places to a varying degree. Fractured surfaces usually have a more rounded appearance. Frost and thaw play a part in the breaking up of flint nodules. Thermal and

[1] These studies have been especially followed by Mr Reid Moir of Ipswich.

ice fractures are very easy to recognise; the flat fractured surface is covered with concentric ripple marks surrounding a tiny knob in the case of fracture by cold, and a small broken surface in the case of fracture by heat. The use of thermal fracture is by no means confined to Nature. There are modern primitive flint-using people who break up the original nodules by heating them in the fire and dropping a drop of water at one point, which produces long flakes due to thermal fracture.

C. *Pressure flaking*. There is a third method by which flint can be fractured. If pressure is applied at a given point along an edge flakes are actually removed; where a large flake is taken off a bulb of pressure is produced, flatter though similar in nature to a bulb of percussion. Pressure flaking is used by many primitive peoples to-day in the manufacture of their tools, and was also used by the Solutrean and Neolithic folk. Little flakes were removed probably with a small bone spatula.

The type of trimming known as "pressure retouch" is distinctive of Solutrean culture, and it is also to be found in Neolithic and later times. Flakes are removed either by a movement like that of cutting a pencil towards you, or by pressing outwards with a pointed tool when the flakes are pushed off away from the operator.

Pressure flaking is also possible in Nature in beds liable to differential movement. Trimmed edges produced by natural pressure have been observed by Professor Breuil in the Eocene beds of Belle Assise near Paris. Still later in 1920 similar specimens have been collected by H. Warren, together with the minute chips which Nature has pressed off, from the Lower Tertiary (Bullhead) beds at Grays, in the lower Thames district. Extraordinarily well-made side scrapers, etc., yet of natural origin, result. At Grays the gravels rest upon chalk and the pressure is due to solution of the underlying chalk and subsequent differential movement of the gravels.

If a blade of flint is pressed against an unyielding surface it reacts as if pressure had been applied from both ends; this is equally true in the case of percussion, for if a flint placed against a flat surface be struck, a bulb of percussion will be

found both above and below, as if a blow had been delivered at either side. Therefore care must be taken in deciding from what direction the pressure or the blow came, when determining if the tool is formed by natural pressure or percussion. In Nature small pebbles are often pressed along a bigger flint, which, when they reach the edge, press out little flakes and produce a trimmed edge. Generally their passage along the surface of the flint leaves a number of fine lines, many of the flake scars of the pseudo-trimmed edge having fine lines also. The occurrence of these striations in connection with a trimmed edge gives us the clue to their natural origin. These facts are equally true for certain of the sub-crag implements of the Ipswich district, though by no means for all.

These fine striations are more easily affected by weathering, the result being very visible scratches on the surface of the flint.

Flint that has been in a fire, either of natural or artificial origin, has a characteristic appearance. If the heating has only been slight there is merely a reddening of the flint produced. If the heating has been intense a crackled appearance is produced on the surface of the flint.

Palaeolithic Tools.

Anvil stone; awl; core; *coup-de-poing*; disc; graver (*burin*); hammer stone; Levallois flake; notched tool; points (including Mousterian lance-points and Solutrean "laurel-leaf" javelin points, etc.); rostro-carinate; scrapers; tap-borer; worked blades; (also) microlithic industries.

Anvil stone[1] (French, *enclume*). These are large flaked nodules of flint with a curved trimmed edge, which would fracture an object placed on it and hammered.

Awl[2]. These are usually made on blades or flakes. They were pointed by flaking. This pointed end varies in size from that of a stout darning needle to that of a thick awl.

Core[3]. A core is a nodule of flint from which flakes have been struck off. In places where flint is rare cores are small, being used to their utmost limit, as for example in the Pyrenees. Where flint is common, as in the Dordogne, the cores are often of large size. In early times implements like

[1] A large example from Laugerie Basse was found in the Magd. 5.
[2] See Plate V, 7, 11, 17.
[3] See Plate V, 15, 16.

coups-de-poing are generally made by trimming cores, implements of later date are made from the flakes removed from cores.

Tortoise Core. This core is used for the production of long blades or of Levallois flakes. The core is trimmed all over in such a way as to determine the shape of the required blade or Levallois flake, which is thus left as a ridge to be finally struck off from the core by a single blow. Those cores from which Levallois flakes have been struck off are often rather of the shape of a tortoise. Long Neolithic cores from Grand Pressigny are, however, equally true tortoise cores.

Coup-de-poing[1]. There are several varieties of this tool; they are generally made from cores, though the finer varieties especially the oval ones are often made by trimming both sides of large flakes. The fine oval *coup-de-poing* is called a *limande* by the French. The most ordinary *coup-de-poing* is pear-shaped, narrowing to a point, the sides bevelled by the removal of flakes so that the centre is thick, and the sides slope to a fine edge. In England a variety of the pear-shaped *coup-de-poing* with a much enlarged base is common.

In some cases the edges of the *coup-de-poing* have a curious twist in them, as if one end when plastic had been given a twist, generally to the right; these twisted tools are almost exclusively of Acheulean age. Finally, in Lower Mousterian times comes a little heart-shaped *coup-de-poing*, triangular, with small secondary flaking all the way round. Some pear-shaped *coups-de-poing* instead of ending in a point, end in a chisel edge.

Disc[2]. This implement is round, oval, or roughly square with very irregular edges, in some cases heavily undercut.

Graver (French *burin*)[3]. A more or less pointed implement with a special "graver facet." These implements are the Palaeolithic equivalent of our narrow chisels and gouges. The facet is formed by a blow struck from the working point along the length of the flint, the blow truncating the edge of the blade or flake[4]. Supposed graver facets should be carefully observed, as only those are genuine gravers that bear the mark of a blow along the length of the blade, proved by the presence of little negative cones of percussion at the working

[1] See Plate I. [2] See Plate I, 7. [3] See Plate IV.

[4] For ordinary trimming the blade or flake is held parallel to the ground. For making the graver facet it is held vertical.

edge of the graver facet. There may be several of these facets, but one at least is necessary if the tool is to be regarded as a real graver. Many varieties of these tools are known. A detailed description of them was made by the late Captain Bourlon, and a simplified version of his work is here given.

Gravers or *burins* fall into two main groups, the difference being determined by an observation of the working edge. In one variety this is straight like a screw-driver, and is known as the screw-driver type, the other variety, being curved like a gouge, is known as the gouge type. The former if rubbed along a soft surface would produce a V-shaped channel like that made by a screw-driver, and the latter a U-shaped channel as in the case of a gouge.

Each of these two main varieties is again sub-divided by a consideration of what the graver facet cuts across in forming a working edge, or what the facet is on the other side of the working edge. For example the graver facet may be cut across another graver facet, or it may be cut across by a trimmed edge the facets of which have been removed by blows given at right angles to the direction of the blow which formed the graver facet. Gravers or *burins* of this variety, themselves sub-divisible, are known as *angle gravers*. In another type the facet of the graver either cuts across the edge of a blade broken across, or it cuts against the natural edge of a more or less pointed blade. In both these latter types the tools are formed merely by making the graver facet; they are therefore known as *single-blow gravers*.

Screw-driver type. In an ordinary screw-driver type, called in French *bec-de-flûte*, the graver facet cuts across another graver facet, on the opposite side of the working edge; but it sometimes happens that the blade is very thick, and more than one graver facet is required. Two cases are possible:

a. When one graver facet cuts across more than one graver facet on the other side; and

b. When two or more graver facets cut across two or more graver facets on the other side of the working edge. It should be noted in both these sub-varieties that the working edge when looked down on is straight like that of a screw-driver, not convex like a gouge, though naturally a number of nearly parallel graver facets produce a working edge that is serrated rather than clean cut.

Single-blow gravers. As has been said these are made by a graver facet cutting either a naturally pointed blade, or the broken edge of a blade. Two sub-varieties are possible, the one made by taking off a single graver facet whilst the other is made by taking off two or more graver facets. In the latter case, as before, if the tool is to belong to the screw-driver type the working edge must be straight.

Angle gravers. In this case the graver facet cuts across a trimmed edge, as already described; two sub-varieties are possible. The trimmed edge may be transverse to the length of the blade, thus forming more or less of a right angle with the facet of the graver. Or, if the trimmed edge is oblique to the length of the blade, forming a much greater external angle than a right angle with the graver facet; and each of these sub-varieties are re-divisible into three, according to whether the trimmed edge is itself straight, concave, or convex.

Pigmy gravers (French, *burins Noailles*). These are specially small angle gravers, characteristic of the Aurignacian; these tools sometimes have a little notch to prevent the graver facet going too far down.

Another small angle graver is characteristic of Tardenoisean times, but in this case the graver facet instead of running along the edge and being a facet at right angles to the main flake, twists round becoming a facet more nearly parallel to the main flake. It is not a *burin plan* because it is not of the gouge angle type.

GOUGE GRAVERS. *Angle*. This type is similar to the screw-driver varieties with the same sub-varieties, except that a convex working edge is produced by the making of a series of graver facets not parallel to one another.

Plane gravers (French, *burin plan*, sometimes called the flat-faced *burin*). Plane gravers are of the gouge type, one of the facets having passed over, and become nearly parallel to the blade itself. The graver facets usually cut across a trimmed edge, but this is not essential.

Gouge type single-blow gravers. Similar to single-blow gravers except that there is more than one graver facet, forming a convex working edge.

Single- and double-polyhedric (*prismatic*) *gravers*. If a series of graver facets producing a convex working edge cut across a single graver facet, the tool is called a single-polyhedric graver or *burin*. If each side has more than one facet

it is called a double-polyhedric graver or *burin*. It should be noted that the difference between polyhedric gravers and the ordinary screw-driver gravers showing several facets is that the former show a definitely convex working edge, and the latter a straight or slightly serrated screw-driver edge.

Beaked graver. This tool is especially common in Middle Aurignacian times. In appearance it rather resembles the prow of a ship turned upside down; the working edge is convex, being formed by a flat graver facet on one side, and a series of convex graver facets up the prow; this produces in fact a keeled scraper made on the breadth of a blade. There are two sub-varieties, the one with a notch to prevent the little convex graver facets from going too far down the blade, and the other without.

The following is a table of the different types of gravers:

Screw-driver Type.

Ordinary or bec-de-flûte
- ordinary.
- single facetted.
- double facetted.

Single-blow gravers
- on broken edge.
- on naturally pointed blade.

Angle
- transverse
  - straight-trimmed edge.
  - concave-trimmed edge.
  - convex-trimmed edge (rare, being useless).
- oblique
  - straight-trimmed edge.
  - concave-trimmed edge.
  - convex-trimmed edge.

Gouge Type.

Angle
- transverse
  - straight-trimmed edge.
  - concave-trimmed edge.
  - convex-trimmed edge (rare, being useless).
- oblique
  - straight-trimmed edge.
  - concave-trimmed edge.
  - convex-trimmed edge.

Plane (*French* plan).

Single-blow gravers
- on broken blades, or
- on naturally pointed blades.

Single-polyhedric.

Double-polyhedric.

Beaked
- with notch.
- without notch.

Hammer stone[1]. Any hard river pebble was used as a hammer stone. The blows given by it are indicated by a bruising of the stone at the point of impact. It may be noted that hammer stones of different sizes and weights were required for different operations in tool making.

Levallois flake[2]. This implement, typical of the end of Acheulean and the beginning of Mousterian times, was made on a flake, the one side being quite flat and smooth, the other flattened by the removal of a series of long flakes; in shape it is either an oval or pointed.

Notched tool[3]. Indentations or notches on tools of various shapes are found, as well as flints where a notch or notches appear to be the chief feature. The indentations sometimes face each other on a blade, producing a neck, sometimes they are alternate. These indented tools are especially characteristic of Middle Aurignacian times, though in both earlier and later industries notches and worked indentations are found on tools. Rarely a notch is found in the sides of *coups-de-poing*.

Points[4]. *Mousterian point*. This tool is characteristic of Mousterian times. It is made on a flake with the same method of trimming as is found on side-scrapers, having one flat surface; they are almond-shaped and pointed at the end.

As is the case with all Mousterian tools there is often a facetted butt.

Audi point. In the Upper Palaeolithic age what is called a point is really a knife blade pointed at the end. The first of the series is known as the Audi point, it is characteristic of transition (Mousterian-Aurignacian) times. In the Audi tool, the pointed knife edge is produced by a flake struck off the flint, this edge being sometimes trimmed; the back of the knife blade is blunted so that it can conveniently be held in the hand.

Châtelperron point. This point is a development of the Audi point characteristic of Lower Aurignacian times. The Châtelperron points are smaller, finer, and the blunting is done by removing more narrow parallel flakes.

[1] Hammer stones have sometimes depressions on two opposite sides. These were useful, no doubt, for holding the hammer stone.

[2] See tortoise core. See Plate I, 11. [3] See Plate V, 19, 20. [4] See Plate III.

Gravette point. This tool is a development of the Châtelperron point, and is characteristic of Upper Aurignacian times. It is much less asymmetric and much narrower, the blunting running right down the back, and being more or less parallel to the knife edge. In some cases the ends are squared off the tool being merely a knife[1].

Single- and double-shouldered points[2]. Characteristic of Upper Solutrean and the end of Aurignacian times. Single-shouldered points have a notch at one side, double-shouldered points have basal notches on both, forming a tang for hafting. It has been suggested that they were derived from certain gravette points with a rounded basal side-swelling which was later omitted, the same result being obtained by a basal notch. Certain broad brown-coloured double-shouldered points of Mousterian age come from the Sahara, and a similar tool of Mousterian age is found at La Ferrassie. The early Neolithic industry of N.E. Ireland also yields a broad double-shouldered point.

Font Robert point. This is the name for the double-shouldered point that first appears with the Aurignacian percussion trimming at the end of Aurignacian times. Sometimes a little pressure flaking is to be seen on the under surface at the tip, showing that Solutrean influence is not far off. Derived from them, this type reappeared in Upper Solutrean times with the Solutrean pressure trimming. The tool also reappears at the end of Magdalenian times.

Barbed point. There is another variety of point known as the barbed point common in the Capsian deposits in North Africa. This at first sight recalls the single-shouldered point, but three differences are very noticeable.

1. The tang is much thinner and slighter than in the case of a single-shouldered point.

2. It would be very easily snapped as it is not a continuation of the backbone of the flake as in the shouldered point.

3. The side formed a sort of barbed tooth.

These barbed points were probably hafted in wood or bone to form a large harpoon barb, whereas the single-

[1] These gravette points with squared ends tend to be rather later in age than the Font Robert stage at La Ferrassie (Peyrony).

[2] Double-shouldered *burins* and double-shouldered end-scrapers are not unknown. They occur in the Upper Aurignacian at La Ferrassie and at Sergeac.

shouldered point was probably hafted on the end of a stick to form a lance-point.

Flat-faced point. This is a small thin fine pointed blade, but with the Solutrean pressure trimming; characteristic of the Lower Solutrean age.

Laurel-leaf point. The laurel-leaf point is of Solutrean age and is made by pressure flaking. It is a flat javelin-point trimmed on both faces, thin and narrow for its size and often pointed at both ends.

Willow-leaf point. This tool is the same as the laurel-leaf point, but only one side is trimmed, the other being the flat flake surface. The true narrow willow-leaf of the French is typical of the Upper Solutrean age, broad varieties occur however with the laurel-leaves in the Lower Solutrean.

Rostro-carinate. The French deny that this tool forms a special type. In shape, it resembles the bow of a boat keel uppermost, the prow being sharpened to a beaked point. The under side of the tool is flat, and both upper sides slope away from a dorsal ridge.

Scrapers*. *Side scraper*. This is a tool with one or more trimmed edges that was used for scraping skins, etc. It is a characteristic tool of the Mousterian epoch, and is known as a *racloir* in French. Side scrapers are made from flakes that have been struck off nodules of flint. The side is then trimmed by a series of little flakes being removed, as if scraped out by small teeth, leaving a sharp working edge only very slightly serrated. If the two opposing edges are trimmed it is known as a double side scraper. As in all Mousterian tools there is often a facetted striking platform (a rare occurrence in older epochs).

Cutter. A flat very thin side scraper is often known as a cutter.

Scraper proper[1]. This also is a tool with a prepared edge for scraping skins, etc. There are two varieties or classes:

1. Those made from cores or on rough flakes[2].
2. Those made on blades or fine flakes.

[1] Scrapers proper are hardly ever found before Upper Palaeolithic times. Certain types of this latter tool are to be found all through Upper Palaeolithic and Neolithic times. Other types are only to be found during certain short definite periods.

[2] Scrapers made from cores are sometimes placed in a class separate from those made on rough flakes.

* See Plate II.

These two classes are in turn sub-divided according to the shape of the tool.

Keeled scrapers. This tool, belonging to the first class, is very common in Middle Aurignacian times. It has a flat under surface, from which the flakes on the upper surface are struck off in a fan-shaped manner; the art of this sort of flaking has been lost, but it has been suggested that the result was produced by holding a finger or string against the top surface of the flint, reversing it and striking the flat under surface. Fine flakes were thereby produced that followed the direction of the string or finger.

Core scrapers. Sometimes flint cores are trimmed into scrapers by striking off the bottom flake; so-called core scrapers are thus produced which at first sight recall the keeled scrapers, but they are essentially different, being neither so regular nor so delicate, and the flaking being broader and rougher, and unlike the keeled scraper they are found at all ages from Upper Palaeolithic times. When the working edge of a scraper of the core class became blunt it was often re-sharpened by taking a flake off the edge, parallel with the bottom face. Such flakes having two parallel faces and showing round the edge part of a blunted working edge are found in the deposits.

Round scrapers. Little round scrapers are characteristically Azilian[1]; they are small circular or oval flints with edges trimmed all round.

End scraper. This tool belongs to the second class being made on a blade. The scraper is made at the end of the flake or blade, which is sometimes flat, and sometimes has a keel or backbone.

Nose scraper. The tools known as nose scrapers are made both on cores and on blades. They are similar to ordinary scrapers except that two lateral notches determine the scraper, forming a tooth-like working end; flat, in the case of nose scrapers on blades, and steep in those formed on cores. They are common in Upper Palaeolithic times.

Tap-Borer[2] (French *taraud*). This is a large awl or pointed digging tool, slightly resembling the *coup-de-poing*; the flaking is the parallel flaking of Upper Palaeolithic times, but the workmanship is rough.

[1] They are also not unknown in Neolithic and Bronze Age times. [2] See Plate V, 12.

Worked blades. Some flint blades bear a fine trimming all round the edge, and are found often in association with end scrapers. Some are more or less pointed.

Microlithic industries. Microlithic industries are found in Upper Aurignacian, Upper Magdalenian, Azilio-Tardenoisean and early Neolithic times; they flourished especially in Tardenoisean times. The industry comprises tiny blades, and tiny knife edges of flint, sometimes with a curved blunted back, producing a tool in shape like a half-moon. There are micro-gravers, and round micro-scrapers, also tiny flat triangles of flint with trimmed edges. Some of these micro-tools may well have been hafted into a wooden frame to form the teeth of a kind of saw. In early Neolithic times we find with triangles a flat trapeze-shaped tool with trimmed edges, which was probably hafted as a saw tooth. At certain places such as Bruniquel, micro-blades of late Magdalenian age have toothed edges.

Neolithic Stone Implements.

A description of the various types of Neolithic stone implements will be given in the chapter on Neolithic times.

Bone Tools[1].

Bone was first utilised in Upper Mousterian times. Bruise marks show they were used as anvils. They only appear as tools in Upper Palaeolithic times. The principal bone implements are:

Arrow straighteners or sceptres; harpoons or fish-hooks; lance-points; needles; spatulae or polishers; throwing sticks; wands or batons.

Arrow straighteners or Sceptres[2]. The simplest form of these occurs in Middle Aurignacian times; those found at the Abri Blanchard show the friction marks of a thong or arrow in the hole. In their simplest form they were made of a solid piece of horn either reindeer or stag, with a hole pierced where the horn or bone branches. In Magdalenian times these implements were heavily decorated, and sometimes had more than one hole in the shaft; at the end of Magdalenian times (Magd. 6) one or all of the holes were often oval[3].

[1] For all the more important bone tools see Plate VI.
[2] Dr Haddon suggests the name "perforated bone staves."
[3] Late examples are often made from a single tine of reindeer or stag.

Harpoons or fish-hooks. There are a certain number of small bone fish-hooks known as gorges, but there are also true harpoons. The latter are often decorated with conventionalised figures, often fish. The most primitive kind are made of bone, the teeth being hardly separate from the main stem; these are characteristic of Magdalenian 4 times[1]. In Middle and Upper Magdalenian times harpoons are made of reindeer-horn, firstly with a single row of barbs nicely curved (Magd. 5), then with a double row also carefully made (Magd. 6 *a*); later, towards the end of Magdalenian times, stag's horn begins to replace reindeer-horn, the double row of teeth becomes quadrangular, and show far less finish (Magd. 6 *b* times). French harpoons have a girdle swelling at the base, and the Spanish ones have a hole in a basal side swelling for attachment. It is said that in districts on the edges of the Magdalenian civilisation the direction of the bottom barb of the harpoon is reversed. In Azilian times harpoons are flat, made of stag's horn or occasionally of reindeer-horn, and very angular; they started with a round hole at the base, in later times this hole became almond-shaped. A kind of stag's horn harpoon was made at the end of Neolithic times in Switzerland; but the workmanship and appearance is totally different to those of Azilian age.

Lance-points. There are lance-points with the base rounded or large, flat, and spatulate and those with a single bevelled end forming a sort of chisel, whilst others have a double bevelled end. Little lozenge-shaped lance-points occur finely made. Some varieties have a dorsal groove running the whole length. For the development of these implements the reader is referred to the chapter on Magdalenian times.

Split-base lance-points. These are typical of the Aurignacian age, being specially common in Middle Aurignacian times. The base is split lengthwise, probably so that it could be attached by a thong passed up the split.

Lance-points with forked base. These only occur in Magdalenian times, a V-shaped notch being made in the base. As a rule the lance-points in early Magdalenian times have the sides of the notch almost parallel, in later Magdalenian times they are divergent[2].

[1] See chapter on the Magdalenian age.

[2] An example of a forked base primitive harpoon has been found at La Madeleine.

Needles. Needles only occur in Magdalenian times. They are found sometimes of reindeer antler, sometimes of bone, and may be eyed or not. They were made with a flint implement, and rounded by being rolled in grooves made in a piece of sandstone; the eyes were made with a fine flint awl.

Darning needles and bodkins. These are made in the same way as needles, but are bigger, and in the case of bodkins the eyed end is flattened. A few of primitive type are found in Middle Aurignacian times, but they are almost all Magdalenian.

Spatulae or polishers. In these tools one end is rubbed down till it resembles the end of a spatula, the rest being left rough.

Spear throwers. These are batons or wands with a projection at one end, against which the weapon to be thrown is laid. This projection and the whole implement is often heavily carved. Spear throwers practically only occur in Magdalenian 4 though one undecorated specimen was found at Placard in Madgalenian 3.

Wands or batons. These are rounded rods, pointed at one end, occasionally grooved lengthwise, and sometimes decorated. There is a kind of wand with one side rounded and the other flat, the latter often decorated with conventional patterns; these occur from Magdalenian 3 to Magdalenian 5.

ADDENDUM NOTE.

Implements which have been embedded in gravels often present special characteristics. Water-wear, blunting the edges, enables us to prove that implements picked from heaps have actually come from the gravels and not from the surface. Ochreous staining is very frequent in the case of implements embedded in gravels, though not absent from surface finds. There is evidence that many of the stained implements from the gravels were exposed on the surface and weathered before being washed into the deposits, and this weathered surface takes the staining more readily than fresh surfaces. The production of incipient cones of percussion (see p. 64) also permits of staining, at first round the little circles, often giving a "toad-belly" patina which afterwards extends over the whole implement. Brightly shining spots ("mirrors of polish") have been noted by Sir J. Evans as probably due to the pressure of flints against one another in gravels. It is not quite clear that they are not sometimes produced on implements embedded in soils, etc. The presence of stalagmitic incrustations and dendritic markings of manganese oxide may be noted as indicating authenticity of implements.

CHAPTER V

EOLITHS

THE origin of Man is still wrapped in obscurity, and it is uncertain as yet, at what moment in geological history we can really say that evolution had developed the Precursor into a true Homo. The general idea of Biologists has been that definite evolution towards the human had been going on all through Tertiary times, and that it was the oncoming cold of the first glaciation which really gave to this beast, who was specialising in brain, the chance to come forward as the King of Creation. If this is indeed the story one would expect to find traces of a very primitive human animal at the end of Tertiary times. The controversy over the existence or not of Tertiary Man has raged for the last half century. The first person to introduce the question was the Abbé Bourgeois, who between 1860–70 collected a series of objects from Thenay, a village south of Orleans (Loire et Cher), about which he read a paper at the Congress of Paris, 1867. He suggested that these objects were man-made; this was denied by Virchow and others, though his idea was accepted by Gabriel de Mortillet, who suggested they were made by a Precursor of true Man. These beds at Thenay are of Upper Oligocene age.

The next discovery was made in 1872 by Carlo Ribeiro, who found a series of objects of suggested human manufacture, in lacustrine beds of Upper Miocene age, at Otta, near Madrid. Again there was a controversy, and once more G. de Mortillet suggested another Precursor. The animals which occurred with these objects indicate a warm climate, and are the following: *Dinotherium giganteum*, *Mastodon longirostris*, *Rhinoceros schleiermacheri*, *Hipparion gracile*, *Tragocerus amaltheus*, *Gazella deperdita*.

In 1877, J. B. Rames discovered Eoliths in Upper Miocene beds at Puy-Courny, and Puy-Boudiou in the department of Cantal (Auvergne). The included mammalia were:

Dinotherium giganteum, *Mastodon longirostris*, *Rhinoceros schleiermacheri*, and *Hipparion gracile*.

Again there was a controversy, and again Mortillet suggested another Precursor.

In 1894 Fritz Noetling called attention to implements in the Lower Pliocene beds, near Yenang Yung, in Burma, but as they came from the surface it is impossible to be certain of their date.

The next move came from the opposition camp, and in 1905 M. Boule published his famous essay in *l'Anthropologie* on the origin of Eoliths. His main thesis was that movement due to stream action, etc., produced definite chipping, and he based his argument on the fact that exactly similar Eoliths were turned out by a mortar-making machine, which he had under observation near Mantes. This paper was capped in 1910 by another in *l'Anthropologie* by Breuil, on the presence of Eoliths in the base of the Paris Eocene beds. Breuil demonstrated conclusively that the regular chipping seen on these Eoliths is made simply by pressure due to the movement of the overlying strata. All kinds and varieties of tools are represented, there being pseudo-core scrapers, pseudo-chisels, pseudo-end and side-notched tools, pseudo-points, awls and side-scrapers, etc. There were also flakes showing a bulb of percussion, or more correctly a pressure bulb. Of a similar nature are H. Warren's finds at Grays formed by a differential movement of the Bullhead beds, due to solution of the underlying chalk.

In 1907 Eoliths were found at Boncelles, by E. de Munck, and A. Rutot, in beds of Middle Oligocene age. A committee was formed to study the question *in situ* and in spite of the fact that one of the committee, Professor Verworn, was a believer in Eoliths, they were rejected, the conclusion reached being that the supposed human flaking was due to pressure applied by the movement of strata[1]. In 1889 Eoliths, often of a scraper type, were found in plateau gravels of an unknown age in Kent, by B. Harrison of Ightham. Rutot suggested that these gravels were of Pliocene age, and the implements were accepted by Prestwich, but denied by Sir J. Evans.

Eoliths have also been published from Daian, Brou (Eure et Loire), also from Lihus near Crevecoeur (Oise), from St

[1] A fresh study of the flints and the age of the beds is to be begun shortly.

Acheul, and from Eschen (Somme). These examples were not accepted as tools by Commont. This settled the problem for a time. In 1910 Mr R. Moir of Ipswich discovered what he thought to be implements in one of the bottom deposits at Bolton and Laughlin's pit near Ipswich. The deposit in question rests unconformably on London clay, and occurs under the mid-glacial sands. It has been definitely classed as Red Crag by competent geologists. Not only were there suggested implements, but also a new tool like the keel of an upturned boat was recognised, and called a rostro-carinate. Bolton and Laughlin's pit was by no means the only locality where these things were found, but Mr Moir was careful to point out that they were not of common occurrence in the diggings. They were studied by MM. Breuil and Boule, and were rejected on the grounds that the various facets show different patina, and therefore were struck off at totally different times; and again that a steady sequence can be seen from obviously natural flints to even the best of these Eoliths, and also many of the facets are in relation to striation due to pressure (see "Flint and Flint Fracture"). These Eoliths have a rather peculiar ochreous, sometimes almost glassy, appearance, and somewhat similar ones have been found in the Upper Dordogne region in channels left after the river had been in flood. It has been suggested that water action of some sort (in the case of East Anglia more likely the receding sea waves sucking back stones, which act like hammers on other fixed blocks of material) is sufficient cause for their manufacture. This has been and still is strongly denied by Mr Moir and his school.

Ice action has been invoked to explain the occurrence of scratches that are seen even on the facets of these Eoliths, although the weathering out of lines of weakness or minute flaws, produced by blows (whether man-given or natural), would seem sufficient to explain their presence.

Here the matter rested till Mr Moir started digging at Foxhall. The section there is very similar to that of Ipswich, except that at the latter Boulder-Clay overlays the mid-glacials, and at Foxhall it is absent. At any rate deposits clearly similar to those definitely assigned to Red Crag times at Bolton and Laughlin's pit, clearly underlie the ordinary

mid-glacial sands. This Red Crag at Foxhall actually contained "floors," that is places where Man or his Precursor lived. There are a quantity of small flakes and fine tools, small borers, and the like, and it really seems difficult not to admit their human origin[1]. The patina of these objects is white, porcelanous, and lustrous, and Mr Moir has brought evidence from other localities to show that objects with this patina are slightly newer in age than those with the ochreous glassy patina already mentioned. The difference is not great, and they would both seem to belong to Upper Pliocene times. The main floor at Foxhall occurs near the top of the Red Crag, and there is another, far poorer in industry, a few feet below. These finds certainly were very surprising and caused even some of the most conservative of the old school to reconsider the position. Rough awls were not unknown among the older Eoliths, being found at Puy-Courny and Boncelles, though not such fine specimens as at Foxhall, but it seems exceedingly difficult to imagine that any natural agency would turn such fine implements as are found at Foxhall round and round delivering blows hard enough to take off flakes, and not so hard as to break the fragile point. M. Breuil visited the Foxhall finds in 1920, and admitted that there was undoubted evidence of the existence of Man in Red Crag times at that place. He noted the occurrence of burnt flints.

Whether or not some or all of Mr Moir's previous ochreous finds are of human manufacture is still a matter of controversy. Many of the specimens which were not considered sufficient alone to affirm the existence of Tertiary Man could now be accepted, since his existence is demonstrated by these fresh finds. Nevertheless the investigator should beware of accepting all the past finds wholesale as being of human manufacture. Although the existence of Tertiary Man seems demonstrated, and although some of the implements of Foxhall, etc.[2] show a certain skill, these early industries are naturally exceedingly primitive, and there is no doubt that water action, both sea and river, and

[1] There are also flints showing the criteria necessary to prove human agency, i.e. blades with no striae and a Bulb of percussion, associated with a trimmed edge.

[2] Other sites which have yielded similar implements are Bramford and Thorington Hall, both near Ipswich.

pressure due to movements of superimposed sediments (such as Breuil has shown to be operative in the Eocene beds of Belle Assise, Paris), are capable of doing much in the way of producing pseudo-implements.

With Eoliths, and indeed with all the Lower Palaeolithic industries before Man took to living in caves, we have to keep clearly in mind that it is only by chance, and rarely, that we come upon an actual floor, i.e. a home. Elsewhere we find only chance tools dropped in the chase, and when these objects are rude and rough they can often be matched by others made by natural agencies. With a floor, or home, such as exists at Foxhall, however, it is a different story, and it becomes exceedingly difficult to explain by natural agencies the numerous little fine tools as well as larger implements which are found there.

Further investigation of Man in these early periods is still going on, and the writer can only congratulate Mr Moir on what he has done, and wish him further success in the future[1].

Analogies have been drawn between these early industries and some tools made by the Tasmanians, while the Middle Palaeolithic tools have been actually compared to those of the Australian aborigines; one must not accept these theories wholesale, interesting as they are, as the gap in Space and Time which lies between the two cultures is so great that it is dangerous to argue any exact relationship between them.

[1] Mr Moir has now published the results of his diggings at Foxhall in the *Proceedings of the East Anglian Prehistoric Society*, vol. III, part III.

CHAPTER VI

LOWER PALAEOLITHIC CIVILISATIONS

Lower Palaeolithic civilisation has three divisions; these are:

Acheulean, type station: St Acheul, Amiens.
Chellean, type station: Chelles (Seine et Marne).
Pre-Chellean, older, i.e. in gravel beds older than those containing Chellean implements.

These civilisations date from the beginning of the Lower Quaternary era, and end with the arrival of Mousterian culture (Middle Palaeolithic), as the last or Würmian glaciation approached. They therefore occupy a long range in time. More especially is this the case for the Pre-Chellean, for we have already adduced evidence to show that the Chellean proper, with its warm fauna, occurred in the interglacial period between the penultimate and last glaciation. In that case the Pre-Chellean has to cover the whole range in time from the penultimate glaciation to the Pliocene age, for as we have seen in the last chapter, there is strong evidence that Man existed at the end of this latter time.

Whether we accept the threefold glacial system of Boule or the fourfold system of Penck, it would seem that the Red Crag was laid down as the climate cooled at the approach of the first of the glaciations. The Pre-Chellean in the first case then would cover the period of time that elapsed from the first glaciation (i.e. from the beginning of the Quaternary era) through the following first inter-glacial period and the second glacial period, up to the Chellean.

The reader will have already noted that he cannot be swayed towards either the system of Penck or Boule by the number of high level terraces following the river valleys of the north. Various movements of land have played a large part in their formation.

Industries.

The implements made by man in Lower Palaeolithic times are fairly uniform and a series of them looks monotonous. Yet the old idea that the *coup-de-poing* was the only tool then used is no longer tenable. Though it is by far the most usual implement found, a certain number of awls and side-scrapers are known. Nor can we continue to think of the Lower Palaeolithic implements as made exclusively from cores of flint, and not from flakes previously struck off, though as is to be expected *coups-de-poing* were more readily made by flake removal, thereby leaving the core as the implement, than by forming them from a flake. It would require a considerable amount of skill to remove a flake sufficiently large to make a useful full size *coup-de-poing*.

As far as we can judge there seems a steady evolution in France and Britain, from Pre-Chellean to the end of Acheulean times. The problem of the possible development of the Mousterian culture further east, during this time, will be dealt with in the next chapter.

In Belgium, as suggested by M. Breuil, true typical Acheulean industries are absent, their place being taken by a rough industry of almost Eolithic appearance known as Mesvinian. Whether or no this industry is to be connected with the developing Proto-Mousterian further east is at present unknown. It is interesting to note that in at least one locality in the east of England, near Clacton, there are, in the low terrace gravel, industries analogous to the Mesvinian of Belgium. This identity was pointed out by M. Breuil when studying the specimens from the Clacton beds in the collection of H. Warren. Bones of *E. antiquus* occur.

Fauna.

Naturally, the fauna changed with the geological epochs Certain Pre-Chellean implements are associated with the early *Elephas meridionalis*, and *Rhinoceros etruscus*, but owing to the great changes in climate which this period covers we can expect no uniformity of fauna in Pre-Chellean times.

In Chellean times, however, the climate was decidedly warm there being such animals as *Elephas antiquus*, *Rhino-*

ceros merckii, *Hippopotamus amphibius*, *Machairodus neogaeus* (sabre-toothed tiger), *Felis spelaea*, *Hyaena spelaea*, wolf, beaver, horse, *Trogontherium*, *Cervus elaphus*, *Cervus capreolus*, *Cervus megaceros*, *Ursus spelaeus*, *Ursus arctos*, water vole, etc. There were molluscs such as *Corbicula fluminalis*, and heat-loving trees like the canary laurel and the fig-tree.

In Acheulean times, when the climate was cooling at the approach of the last glaciation, there was an admixture of *Elephas primigenius*, *Rhinoceros tichorhinus*, bison, etc. In Chellean times the land seems to have been higher than it is to-day; instead of the English Channel there was only a broad valley, and the land spread further westwards even than Ireland. The Mediterranean was represented by two small lakes, but on the other hand the Arctic Sea covered the land, nearly down to the Caspian Sea, in a broad gulf. This extension of the Arctic Sea southwards points to an African origin for the Chellean civilisation, rather than to an Asiatic, the only way into N.W. Europe being from the south. Chellean implements are common in North Africa. To the north-west there was possibly a bridge uniting Europe and North America, by way of Iceland, the Faröes and Greenland.

Distribution.

If we may judge by the form of the implements this Lower Palaeolithic civilisation seems to have been well nigh universal. Perhaps we are still dealing with the main stem of the human race, from which as yet no separate branches had sprung, though an early one (the Mousterian) is already budding.

Lower Palaeolithic implements occur all over England, the most northerly finds being in Derbyshire and possibly in Yorks.; almost all over France, a large *coup-de-poing* having been lately found in a cave above Monaco[1]; in Cantabria and in South Spain, at such places as S. Isidro, near the head waters of the Tagus, and along the Laguna de la Janda, in the Tarifa district. At Torralba in the province of Soria, Lower Palaeolithic implements occur not only with *Elephas*

[1] This find is important as these implements had not hitherto been found in the Riviera district.

antiquus, but with *Elephas meridionalis*, and *Rhinoceros etruscus*. We therefore have to deal with a very early Chellean, or more probably Pre-Chellean epoch. It is considered by some that the remains of *Elephas meridionalis* are older than the implements, these latter being truly Chellean.

Lower Palaeolithic implements are found in Africa, even in the south, as for example at Port Elizabeth, etc. Some very fine ones were brought back by Seton-Karr from Somaliland. They are found in Egypt, Syria, Asia Minor, and even in the alluvial gravels of India. They are present in Russia, Germany, and Belgium. During the war a poor *coup-de-poing* in quartzite was discovered at Salonica. The only country where they seem to be very rare or absent is Australia.

It is of course a very dangerous thing to infer the existence of a uniform universal race from the occurrence of similar implements, and above all to infer a uniform universal race of the same age in time. It is always a moot point how far similar conditions produce similar cultures. On the other hand wherever we go we seem to find the earliest manifestation of the culture of Man in the form of these Lower Palaeolithic implements, and there is every possibility that we are dealing with an early step in the evolution of mankind, an evolution which spread abroad and underwent different developments in various regions. These developments acting on each other produced the great diversity of types which we find to-day.

Pre-Chellean Age.

The Pre-Chellean age has been divided into various sections by Rutot of Brussels, "Strepyan," "Mesvinian," etc. It is better to class them together under the one heading Pre-Chellean.

A very good place for studying the Pre-Chellean beds is at Helin quarry, Spiennes, Belgium. According to Rutot, the section through the first terrace there gives:

Soil; brick earth; loess; gravel; bedded loam; gravel with Lower Acheulean implements; sandy clay; gravel with Chellean implements; river sand; gravel with Pre-Chellean (Strepyan) implements; river sand; gravel with Pre-Chellean (Mesvinian) implements; sandy clay; gravel with Pre-Chellean (Mafflian) implements; chalk.

In certain sections there is even a lower layer known as Reutelian. M. Breuil admits the humanity of the Mesvinian culture, but claims that practically the whole Lower Palaeolithic culture of Belgium is represented in the Mesvinian industries[1].

Pre-Chellean implements consist of primitive *coups-de-poing* and rough stone picks. Both of these usually have a good deal of the original nodule of the flint at the base of the implement. There are also some rude knives and scrapers, some of the latter having a notch on the side. It should be borne in mind that not all the objects claimed by Rutot as of human manufacture are accepted, many of them having been made possibly by natural agencies.

Another locality which is probably of this age is St Prest in the Paris basin. The beds consist of coarse river gravel, and represent a high terrace (30 metres level), probably of Lower Cromer forest age, i.e. an inter-glacial period older than the Riss-Würm. The fauna is warm, and includes survivors from Tertiary times such as *Elephas meridionalis* and *Equus stenonis*. Some rough implements of eolithic type were found, and a number of incised bones. These latter were probably scratched by natural agencies.

Pre-Chellean implements are also found in the gravels of the third terrace, and at the bottom of the second terrace in the Somme valley at Amiens. Mr Moir, of Ipswich, considers that the early *coup-de-poing* is a direct and obvious development from his earlier rostro-carinate form. True rostro-carinates are sometimes found in Lower Palaeolithic layers.

Chellean.

In the quarries of the type station of Chelles, we get a series of gravels containing Chellean and Acheulean implements, above which are others containing Mousterian with a cold fauna. The Chellean implements are very similar to the Pre-Chellean except that they are considerably better made. There are long *coups-de-poing*, sometimes very pointed, the edges being uneven. Some specimens are nearly almond-shaped. There are also crude scrapers and awls.

The peculiar English variety of *coup-de-poing* with an

[1] No doubt a certain number of genuine Acheulean and Chellean tools passed from the Somme valley into Belgium in prehistoric times.

enlarged base has already been mentioned in the chapter on "Flint, Flint Fracture and Palaeolithic Tools."

Acheulean.

The succeeding Acheulean culture seems simply to be a further improvement of the Chellean tool, associated with a cooler fauna. The edges of the *coup-de-poing* become much more even and less serrated, and broad oval tools are evolved, which tend to become more pointed in late Acheulean times. We also note the appearance of a so-called twisted *coup-de-poing*, in which the pointed end of the tool seems to be slightly twisted from the butt end. Some writers have considered that this was not intentional, but merely due to the way the implement was chipped. Others have thought that it served the purpose of assuring a straight shot when the implement was thrown. In any case these tools seem to be typically Acheulean.

In late Acheulean times there is the final development of a small oval almond-shaped *coup-de-poing*, knives, awls, and the industry of La Micoque, the type station of which is near Les Eyzies, Dordogne; we have also the invention of the Levallois type of flint flake. The latter is a more or less oval, flat flake trimmed on one side, while the implement of La Micoque is a small fine triangular *coup-de-poing* in the shape of a lance-point. Bone implements seem never to have been used by Lower Palaeolithic Man, possibly the only exception being the immense roughly-pointed elephant's bone from Piltdown[1].

Then as the climate grew colder, layers were deposited on the top of the Upper Acheulean gravels, and in those layers, for the first time since the penultimate glaciation, we find reindeer's bones. The occurrence of these bones marks the commencement of the next, or Mousterian age, which will be dealt with in the following chapter. It may be noted that the reindeer does not occur in latitudes south of France in Mousterian times.

[1] See chapter on Prehistoric Man. It is to be noted that the workmanship of this immense tool is not that of bone but of wood, and there is every probability that wooden tools were used at this time, though they have not been preserved. M. Breuil has pointed out that the notch on one side below the pointed end is of such a nature as to have been made by the fangs of some beast which probably seized the implement in its teeth when attacked by Man. As a matter of fact H. Warren has found a pointed wooden tool in peaty beds at Clacton of Mesvinian age.

CHAPTER VII

MOUSTERIAN CIVILISATION OR MIDDLE PALAEOLITHIC TIMES

(often classed with the Lower Palaeolithic by some writers who do not separate a Middle Palaeolithic era)

THE geological position of the Mousterian culture has already been discussed, the conclusion being that it straddled across the last glaciation. The race who made this culture was of a low type known as the Neanderthal race. Are we to trace any connection between the inferiority of the race, and the cold miserable conditions in Western Europe under which it lived? This is a question for the biologist to settle. It seems, at any rate, that Neanderthal Man was not in the direct line of succession of human evolution.

Except for the so-called "warm" Mousterians, which we shall deal with presently, the commoner animals found associated with these people are: mammoth (*Elephas primigenius*), woolly rhinoceros (*Rhinoceros tichorhinus*), reindeer, arctic fox, arctic hare, banded lemming, ibex, wild horse, wild cattle, bison, cave bear, brown bear, giant deer, stag, glutton, wolf, fox, cave lion, cave hyena (the two latter *warm* animals surviving from Chellean times, and accommodating themselves to the changed climate). To these may be added during the extreme cold of Mousterian times, the obi lemming and the musk ox. The reindeer does not occur in Mousterian deposits in latitudes south of France. In early Mousterian times and probably also during the slightly less rigorous interval in the middle of the fourth glaciation, known as the Laufen oscillation, there was an admixture of a few warmer varieties such as *Rhinoceros merckii* and *Elephas antiquus*. The great cold of Mousterian times drove Man to the extensive use of caves and rock shelters as homes. That does not mean to say that we do not get the remains of earlier civilisations there, nor that Mousterian Man is

never found in open stations, but it is the first time that these natural homes were really sought for, and became essential to Man's well-being. Unlike Lower Palaeolithic Man, Mousterian Man preferred to trim flakes taken off large nodules of flint for his tools, rather than fashion the cores into implements, as had been the habit of the older civilisations. It should be carefully borne in mind that this is by no means invariable; there are implements made from flakes in Chellean times, and implements made of cores in Mousterian times; but, as is obvious, the making of implements from a large flake is a great saving of time, and as the Mousterian had learnt to strike off these large flakes, we find the great majority of the implements made from them[1]. In order to strike off long flakes, it is necessary to have a good striking platform, and so, in Mousterian times we find a large number of striking platforms prepared by facetting. These facetted striking platforms are not unknown in the Lower Palaeolithic era, but they had much less *raison d'être* when the flakes to be removed were of less importance in themselves. Again, in Mousterian times though we find no true bone implements, we do find a series of bones bearing bruises, scratches, and saw-marks showing they were used as anvils, etc. These utilised bones are found in great quantities at La Quina[2]. At the same place a certain number of shaped spheres of limestone have been found, some of which are too big for sling-stones, and it has been suggested that they were attached to a thong, whirled round the hunter's head, and flung at the prey. This is only theory, but the fact that Man had means of killing large and thick-skinned animals, as we know from the presence of their bones in the deposits, has to be explained. The following tools occur especially in Mousterian times:

(1) Small *coups-de-poing*; (2) Levallois flakes (at very bottom); (3) side-scrapers; (4) cutters; (5) points; (6) discs; (7) awls (not common); (8) end-scrapers (very rare); (9) double-shouldered points (in certain areas, such as the Sahara); (10) blades (at Grimaldi, etc.).

Resolved flaking which removes short flakes was used in Mousterian times, as has been noted in the chapter on tools.

[1] Tortoise cores are common, being formed in the manufacture of Levallois flakes.

[2] See Plate V, 23.

We have classed the La Micoque culture as occurring at the very end of Acheulean times, owing to the absence of reindeer. As belonging to the earliest true Mousterian culture we may cite the industry of the little rock shelter of Combe-Capelle, Montferrand, Dordogne. There are reindeer bones, small *coups-de-poing*, and Mousterian points, also side-scrapers.

A little later than this we have at Moustier itself a whole series of industries, where the Mousterian points are exceedingly numerous and well-made, as are the side-scrapers, and where the *coup-de-poing* becomes rarer, dying out in the upper levels altogether. Lastly we come to an Upper Mousterian culture, best seen at La Quina, where *coups-de-poing* are absent, but where the points, side-scrapers, cutters, etc., are of great beauty and fine workmanship. Above this at certain places is found the almost eolithic industry of transitional times (Audi), which though it is considered here is probably best regarded as due to an early infiltration of an Aurignacian culture. We can then divide this period into:

Transitional (better classed with the Aurignacian).
Upper Mousterian.
Middle or typical Mousterian.
Lower Mousterian.

Distribution.

The remains of Mousterian Man cover a very wide area, being found in Britain, France, Spain, Italy, North Africa, Germany, Moravia, Russian Poland, Croatia, the Crimea, and Asia Minor. As the Mousterian civilisation had such a wide distribution, and was so uniform in type, only a few localities in each area will be given. These are mostly caves, though a few are open stations.

Mousterian Man chose local rock for making his tools even if the material was poor, as there was apparently no commerce in flint; this makes correlation in different areas exceedingly difficult. (An asterisk attached to the name of a locality indicates that the section is given elsewhere in this book.)

Britain.

Localities in the gravels of the lower terraces of the Thames.
St Brelade's Bay (Jersey). (Single- and double-shouldered points found.)
Kent's Cavern (Torquay).
*Cave of Paviland (South Wales).
Caddington (Bedfordshire), actual floors.
*Cambridge and Mildenhall district.
*Ipswich (in Boulder-Clay, and the gravels of the Gipping).
Part of lower deposits at Cresswell Crags, Derbyshire.

France.

North. *Somme valley, etc.
East. *The Trilobite (near Arcy-sur-Cure, Yonne), etc.
South. Bouchièta (Ariège); *Gargas (Hautes Pyrénées); *Grotte du Pis de la Vache, Lacave (Lot).
West. Pair-non-Pair (Gironde); La Quina (Charente); *Placard (Charente); *Chapelle-aux-Saints (Corrèze); Chez Rose (near the Aurignacian station of Coumba del Bouitou, Brive); *La Ferrassie des Grèzes; *Laussel; Moustier; Couze; etc.

At Moustier, the type station, there are two rock shelters one above the other. The lower one contains Lower to Upper Mousterian industries, while the upper one shows Middle and Upper Mousterian industries. The section of the upper rock shelter shows eight layers, the top one being Aurignacian, the second transitional (Audi), and the rest Mousterian, except the seventh, which is sterile[1].

Italy (according to Mochi, Geneva, 1912).

La Grotta near Cassino.
Grotta di Scalea.
Grotte du Prince (Mentone).
Olmo.
Grotto di Romanelli (Otranto), lower level.
Grotto di Cucigliana, lower level.
S. Maria dei Bagni.
The middle terrace of Sauterno.

The fauna so far south as Italy is no longer arctic, but includes the bones of *Elephas antiquus*, *Rhinoceros merckii*,

[1] The lower rock shelter shows certain peculiarities in detail. The section from top to base is: Lower Aur. with broad, coarse split-base point: Audi: typical Moust.: Moust. with Audi forms and few *coups-de-poing*: Moust. with some Audi forms and many *coups-de-poing*: no *coups-de-poing*, some Audi forms, a poor industry, no reindeer, but rhinoceros and stag, ? Acheulean.

and hippopotamus. At the end of Mousterian times and in the Lower Aurignacian age it was rather colder. Though the latitude would seem quite enough to explain the warm fauna in Mousterian times in Italy, it is obviously a different story when it comes to the anomalous warm Mousterian fauna of Germany and North France.

Spain.

*Castillo.
*Hornos de la Peña.
*Cobalejos (Cantabria).

The gravels in the basin of the Guadiana, except the edge of the Sierra de San Servan (Calamonte), and elsewhere in South Spain.

North Africa.

Morocco, Algeria, Tunisia, and Egypt, at Tabelballa (to the south of the department of Oran), and as far south as Timbuctoo.

The industries of the desert areas south of Morocco and Algeria are exceedingly interesting and still await a detailed study[1]. There are typical Lower Palaeolithic implements, the material used being a brown quartzite very similar to that of the Drift implements of India and of South Africa. There are also a large number of broad points many of them double-shouldered; these latter were at first thought to be Neolithic there being one locality where, according to M. Pallary, they are to be found overlying one polished stone axe. The possibility of errors in stratigraphy has been pointed out, and they are now definitely considered to be of a developed Mousterian age. There are various reasons for this conclusion.

1. In a locality in South Algeria, the results of which are as yet unpublished, they have been found with a Quaternary fauna.

2. The material and preservation is similar to that of the Lower Palaeolithic *coup-de-poing*, not at all fresh looking as one would expect if they were truly Neolithic.

3. If a series be made out they are found to grade on the one hand into what typologically are Mousterian points, and on the other into a sort of pseudo-Solutrean. This no

[1] See Dr Seligman's forthcoming paper on similar industries from the Egyptian desert. *Royal Anthr. Inst.* 1921.

doubt was due to contact with the Capsian industries that fringed the southern shore of the Mediterranean, being similar to the true Solutrean which, as we shall see later, was a hybrid between the Aurignacian and the Lower Palaeolithic beyond (in central Europe).

4. These double-shouldered points are also found with discs, scrapers, etc.

5. The double-shouldered point is also found in definite Mousterian deposits at La Ferrassie.

Eastern Mediterranean.

Syria, in the caves of Wahr Ibrahim, with bison, etc., and in other caves further north in Asia Minor.

Belgium.

Numerous Mousterian localities, as for example, Spy and La Naulette (near the junction of the rivers Lesse and Meuse).

Switzerland.

Wildkirchli (peak of Santis, 1500 metres above sea-level).

This cave was a nunatak in Würmian times; the fauna associated with the Mousterian industry, which is of a very primitive type, includes: *Felis spelaea*, *Felis pardus*, *Ursus spelaeus*, *Cuon* or *Dhole alpinius*, *Canis lupus*, *Arctomys marmotta*, *Lutra vulgaris*, *Capra ibex*, *Capella rupicapra*, *Cervus elaphus*.

*Cotencher (Neufchâtel). See chapter on Man in relation to geology.

Germany

*Achenheim (Strasbourg).
Kartstein.
Baumannshöhle.
Open station of Mommenheim (Rhine provinces).
The gravels of Markkleeberg (Leipzig).
*Sirgenstein.
Irpfelhöhle.
Raüberhöhle (near Ratisbon, Bavaria).
Kösten (Lichtenfels).
*Klause (Bavaria).
Taubach (Weimar), very old Mousterian with a warm fauna: *Elephas antiquus*, *Rhinoceros merckii*, *Ursus arctos*, *Equus germanicus*, *Cervus elaphus*, *Cervus euryceros*, *Cervus capreolus*, *Bos priscus*, *Felis spelaea*, *Felis lynx*, *Hyaena spelaea*, etc.

Austria and Hungary (pre-war).

Cave of Gudenus (Krems).
Open stations near Drosendorf (Lower Austria).
Cave of Šipka (Stramberg, Moravia).
Krapina (Croatia).
Miskolcz.

The fauna of this latter according to Gorjanovic Kramberger includes: *Bos primigenius*, *Ursus spelaeus*, *Rhinoceros merckii*, *Sus scrofa*, *Canis lupus*, *Felis spelaea*, *Arctomys marmotta* (only on upper levels and very rare), *Equus caballus* (rare), *Ursus arctos* (very rare), *Cervus elaphus*, *Cervus capreolus*, *Cervus megaceros*.

Russia.

In the caves of Wierzchow, near Oicow or Ojcow.
Oborzyskowielkie.
In the Crimea, at the Grotto of Labo (Simferopol).
In the Caucasus, near Ilskaja (province of Kuban).

There are one or two places where the Mousterian culture is found accompanying a warm or Chellean fauna; such, for example, as Krapina (Croatia), Taubach (on the borders of the Thuringian forest), the Grotte du Prince at Mentone, and certain places in the Amiens district. The occurrence at Mentone was explained as being due to the peculiarly favourable conditions from the climatic point of view on the Riviera. The discovery of a similar state of affairs at Amiens made another theory necessary. The industry here was a peculiar kind of Mousterian with long blades, and the associated fauna included *Elephas antiquus*, hippopotamus, *Rhinoceros merckii*, horse, stag, *Felis spelaea*, bison, wild cattle, and brown bear. Both industry and fauna are found in the gravels in the bottom layers at the quarry of Boutmy-Muchembled, at Montières-les-Amiens; and these layers were overlaid by younger loess having a cold fauna, and Lower Mousterian implements at the base. It is not possible accurately to determine their chronology in respect to the Acheulean which is absent from this terrace; the fluviatile gravels of the bottom terrace, situated further south in the quarries of Etuvy, contain Upper Chellean implements with

a warm fauna. It may be that this peculiar Mousterian is of the same age as the Acheulean, and at any rate it is older than the true Lower Mousterian, and as the river migrated northwards just before the Würmian elevation caused it to cut its way down to the bottom half of the bottom terrace, the gravel layers containing the warm Mousterian fauna may be slightly newer than those further south containing the developed Chellean.

A theory has been advanced suggesting that whereas in France, the Chellean Man developed into the Acheulean; in Germany, he developed into the Mousterian Man. Localities of true Acheulean age are excessively rare in Germany, and do not occur further east, where the Mousterian remains are found. As will be seen later when we deal with the skeletons of prehistoric Man this will explain the fact that the Heidelberg jaw is rather like a massive primitive Neanderthal example, and is quite different from that of Piltdown, which may be in the line of French development Chelleo-Acheulean. This is of course only theory, and against it may be placed the fact that workers in Dordogne find a great difficulty in distinguishing between Upper Acheulean beds, and Lower Mousterian beds. In fact M. Peyrony often only solves the problem by the absence or presence of reindeer. But by the time Mousterian Man penetrated as far west as Dordogne, his culture may have been slightly modified by the aboriginal Acheulean industry.

The transition period between the Upper Mousterian and the Lower Aurignacian ages, is best studied at the rock shelter Audi, near Les Eyzies. There are industries there that are later in date than the final Mousterian phase of La Quina, but which, from the typology of their implements, are still connected with the Mousterian culture, though Aurignacian types are beginning to occur as well. The Transitional or Audi civilisation was either made by Mousterian Man under Aurignacian influence, or possibly by the forerunners of the Aurignacian culture who arrived and lived in a milieu which was still Mousterian. It is best to consider the Audi industry as being a very early Aurignacian development. The Aurignacian civilisation does not seem to have evolved from the Mousterian, among which race it

came as an invading infiltration. The industry of Audi seems rather to represent a time when the two civilisations were living side by side in France, the Aurignacian increasing and the Mousterian decreasing, crushed out by the superior civilisation. The Audi folk may well be a relic of the Mousterian civilisation, which learnt to make certain new types of implements, and new methods of flaking from the oncoming Aurignacians. The rock shelter Audi was first mentioned in 1905, and a monograph was written on it by Dr Lalanne, who pointed out its transitional aspect. The implements can be divided into three groups. One rarely found series is dull, of muddy patina like those found a short distance away on the surface, and consists of very decomposed blades. It is clearly Aurignacian, and corresponds to what had been thought at first to be Magdalenian. Another series is clearly Mousterian; the implements are sometimes dull and very decomposed, sometimes lustrous and patinated, like those of the rock shelter near by, or those from the clay of the plateau; these come from the extreme foot of the deposit. The flints of main interest have no patina, and are often encrusted more or less with concretions. Being chalcedonous they are poor material for delicate work, their colour is generally black, though occasionally reddish or grey, and some rare flints that are of better material are brown. There is also a little yellow jasper. The types of implement are:

(1) awls; (2) certain curved points peculiar to the deposit; (3) *coups-de-poing* (almond-shaped implements); (4) discs; (5) gravers; (6) notched tools; (7) points; (8) side-scrapers; (9) scrapers.

1. **Awls.** Some awls are only chance tools such as the angle of a point or the end of a flake, which in some cases is slightly improved. True awls do occur, as for example one where a concave trimmed notched flint forms two awls, i.e. the horns of a sort of crescent moon.

2. **Certain curved points.** This is the commonest type of tool found at Audi; they are a number of blades and flakes with one edge artificially blunted and an axial curve usually from right to left which was obviously looked for or made in the flaking of the flint. This peculiarity occurs occasionally in the earlier epochs even in the Acheulean,

and becomes commoner in the Upper Mousterian age, accompanied by symmetrical forms and side-scrapers. There are examples from Audi that recall these proto-types; sometimes the flint is thick and much trimmed on the two sides, sometimes one side is still encrusted with the outer surface, and is not trimmed, while the other is. It seems evident that the trimming on the convex side is only to make a good finger-grip, while the opposite sharp edge is used for cutting purposes. The convex edge is not sharp, and has, unlike the other, no marks of usage. Sometimes the trimming recalls the Aurignacian style, sometimes the Mousterian, often it is irregular and not typical. The curve goes both ways, though, as Man is usually right-handed, it generally is to the right. The later Châtelperron point, of much finer Aurignacian technique, differs from the point of Audi in that it was formed on a true blade; the Châtelperron point is truly Aurignacian, as it is found with split-base points, etc.

3. **Coups-de-poing.** There are a score or so of *coups-de-poing* the workmanship of which is far from delicate, and the types far from regular. Sometimes the workmanship is so poor that they would hardly be taken for true implements, and they are of small size. Sometimes the point is replaced by a chisel edge; only three examples of the lance-point form so common at La Micoque have been found.

4. **Discs.** No sharp line can be drawn between discs and the *coups-de-poing*; some are very poorly made, others show better workmanship.

5. **Gravers** (see 9. **Scrapers**).

6. **Notched tools.** Although notched tools do occur in the Mousterian and earlier periods, they are not common before the Aurignacian, where on certain levels and in certain deposits they are very common. At the rock shelter of Audi they are not very characteristic; the symmetrically notched tools so common in later Aurignacian times only begin to appear in the Audi level, though several occur.

7. **Mousterian Points.** These are very rarely found and are not at all typical.

8. **Side-scrapers.** This is the implement characteristic of the Mousterian age, and no good ones have been found in the Audi deposit, though there are some poor examples.

There is one that has a straight side-scraper edge on the upper face to the right, and a convex side-scraper edge to the left on the lower face.

9. Scrapers. The scraper and the graver are the commonest tools in the Upper Palaeolithic age. But trimmed flakes that make one think of scrapers are found from Acheulean and Mousterian times. At the latter epoch the side-scraper sometimes continues to the end of the blade, forming an end-scraper. Two types are characteristic of the Upper Palaeolithic era, the one short and massive, the other a scraper at the end of a long blade; both these types occur in the Audi deposit; towards the upper half we get a very primitive form of keeled scraper, as well as the debris in bone of needles and bodkins. Only one or two definite gravers have been observed; there is for example a kind of oblique angle graver, but the side face has not been made with a true lengthwise graver blow.

Other indications separate the Audi culture from the Mousterian. For instance the bulbs of percussion are often big and multiple, and have not been removed as is so common in Mousterian tools; there are also a fairly large number of rough blades, as well as bone bodkins. Audi is the transition between the Aurignacian culture of Châtelperron, and the Upper Mousterian of La Quina (Charente), and Hastière (Belgium).

The late Captain Bourlon noted in the upper rock shelter of Le Moustier, on the surface, a layer containing a few worked bones, and some scrapers, gravers, etc. This is of Aurignacian age. Lower than this level comes one where Mousterian types are rare and small, and where instead quite bizarre types of tools occur. There are a number of long blades and long flakes with a convex trimming ending in a point, recalling the point of the rock shelter of Audi. Notched tools and gravers occur occasionally, as well as two thick scrapers, which from their channelled trimming are the first signs of the keeled scrapers of later age. The degenerated *coups-de-poing* that occur at Audi have not actually been found at Le Moustier, but as they occur in a level just below with a graver almost in contact with a *coup-de-poing* they are probably to be associated with the level of

which we have been speaking. Below this level come true Mousterian levels. M. Peyrony found the same state of affairs in the lower rock shelter; though here Audi types of implements seem to occur in varying proportions, down into lower levels of true Mousterian age.

The Audi point also occurs at Pair-non-Pair between the Aurignacian and Mousterian levels; there were about a score found at the top of the Mousterian layer, and some forty at the bottom of the Aurignacian, while only about seven have been found in later layers. These points from their channelled appearance tend towards the Châtelperron point.

At Montières (Somme) there is a layer with rough blades and curved points. As a utilised bone (ox) corresponding to those found at La Quina has been found in the same quarry, the blade layer is probably of Audi age.

Tunis and Sicily (collections of Paul Boudy).

The Audi point and transitions to the Châtelperron point and to the Gravette point are found in post-Mousterian deposits. Scrapers, some more or less circular, and angle gravers with a transverse or concave terminal trimming occur, which are certainly of the same age as the Lower Aurignacian tools, and correspond more particularly to those in the Audi deposit.

CHAPTER VIII

THE UPPER PALAEOLITHIC AGE

The Upper Palaeolithic age is perhaps the most important period that the Prehistorian has to study. It is heralded by the arrival of Neoanthropic Man, a race far higher in the scale of humanity than any preceding one. It is at the commencement of this time that we find the beginnings of that Art in caves and on objects that not only is the delight of the student from the purely artistic point of view, but further, lifts the veil and gives us a glimpse of the life and feelings of these prehistoric folk.

In succeeding chapters the various divisions (Aurignacian, Solutrean, Magdalenian, Azilian) of the Upper Palaeolithic age will be considered separately. Here it will be our business to consider the time as a whole from the point of view of climate, general culture, distribution, origin, etc.

Climatic Conditions.

Upper Palaeolithic Man appeared in France after the maximum of the last glaciation. At Amiens his implements are found in the middle and upper parts of the younger loess as well as on its surface, though under the peats.

The climate was very cold throughout the whole of Upper Palaeolithic times; though in the height of the Achen minor oscillation, which corresponded with Aurignacian times, the mean temperature was slightly warmer. All through Upper Palaeolithic times in France we find an admixture of stag with reindeer[1]. The possibility however that the reindeer of France, though cold loving, was not the tundra variety, has already been mentioned, for it may be noted that in the Dordogne even in Magdalenian times, the oak and sweet chestnut are found in the deposits[2]. The

[1] Further south in Cantabria conditions were always less rigorous except at the maximum cold of Magdalenian times, for instead of mammoth we get (judging from the cave art) a short tusked elephant (*Elephas antiquus*), and instead of reindeer a quantity of stags and hinds. Towards the end of Aurignacian times some reindeer appear, and become commoner in Magdalenian times.

[2] The oak occurs in the Upper Palaeolithic deposits at Sordes and the oak and sweet chestnut at Abri Mège.

climate of the north and of the Alpine region was relatively much colder. The reindeer of these regions, judging from the drawing of one found at Kesslerloch, was the real tundra-loving variety. During the maximum cold of Middle Magdalenian times the reindeer had nearly displaced the stag even in France. The stag reappeared however towards the end of the Magdalenian age, and in its turn ousted the reindeer for ever.

Aurignacian, Solutrean and Magdalenian times
(largely steppe and loess forming).

In Lower Aurignacian times in the Alpine areas and Northern Europe, the obi lemming occurs, indicative of very cold tundra conditions, and all through Aurignacian, Solutrean, and Magdalenian times, we find remains of tundra life such as reindeer, mammoth, woolly rhinoceros, musk-ox, arctic fox, variable hare, and glutton. But we also find especially in Middle Aurignacian times steppe and browsing animals such as wild horse, bison, wild cattle, stag, roebuck, giant deer, brown bear, etc.

As has been noted the heat-loving cave lion and cave hyena seem to have accommodated themselves to the colder conditions, and survive to the end of Palaeolithic times.

Magdalenian times in the Alpine areas opened (according to R. R. Schmidt) with moist tundra conditions which were followed by a dry steppe period in Middle Magdalenian times, then the climate became damper, slowly ameliorating, till in Azilian times it resembled the climate of to-day, though rather colder.

In the first of these cycles we find musk-ox, mammoth, woolly rhinoceros, reindeer, obi and banded lemming. In the second jerboa, horse, saiga, and reindeer roaming as far south as Mentone. In the last stag begins to replace reindeer, mammoth, woolly rhinoceros, and cave bear become rare, and finally extinct; and bison also disappears from France at the end of the cycle.

In South France in similar latitudes, the climate though cold and dry seems seldom to have been so rigorous as in the Alpine areas and North Europe, nor can R. R. Schmidt's cycles of climate be recognised in West France. The saiga however

appears in the Upper Solutrean age, and continues to the Lower Magdalenian age, at which period reindeer bones occur even in Cantabria. The maximum of cold in France seems to have been reached in Middle Magdalenian (M. 5) times, at which time the lemming is found at Teyjat in Dordogne in deposits containing harpoons with a single row of barbs. As in the northern areas the percentage of reindeer decreases in Upper Magdalenian times, their place being taken by the stag (*Cervus elaphus*). The final disappearance of reindeer corresponded with the appearance of the Azilian culture. The fauna and climate found in Capsian times (the African equivalent of the Upper Palaeolithic of Europe) is naturally different.

Industries and Culture.

The Upper Palaeolithic culture with its bone industries is something new. The break between the Upper Palaeolithic civilisation and that of the Mousterian is as absolute as that between the Old and New Stone Ages. The so-called "zones of transition" by no means represent a progressive development from the older to the newer civilisations, but are probably due to the influence of an Upper Palaeolithic advance-guard penetrating to the older Mousterian civilisation. It is immaterial whether we consider such so-called transitional industries as l'Abri Audi as being made by Mousterian Man under the new influences, or by a few forerunners of the Aurignacian race, swamped by the Mousterian culture into which they had forced their way. In any case these examples do not represent a zone of *evolution* between the two civilisations. In this work the industries of l'Abri Audi, etc., have been treated of in the Mousterian chapter, but this does not mean that the writer holds any firm conviction that they were the work of Neanderthal man.

The true Upper Palaeolithic industries are profoundly different from the Upper Mousterian. Instead of a monotonous series of side-scrapers and Mousterian points, hardly varied by the presence of a few discs, or other Lower Palaeolithic types, we find a truly bewildering profusion of tools. Gravers (*burins*) are found practically for the first time, most of the varieties being present from the earliest Aurignacian

times, as well as end-scrapers on long blades and other varieties and the proto-types of the true "keeled scrapers[1]."

The roughly-made asymmetric Audi point, brought into these beds no doubt by early Aurignacian influence, develops in the true early Aurignacian layers into the more daintily-made Châtelperron point, which in turn passes on in Upper Aurignacian times into the La Gravette point. The technique in the making of flint implements is quite different from that of the earlier times. No longer are small semi-circular resolved flakes taken off, but the method of parallel flaking is introduced. Such flaking as occurs, for instance on the beaked scrapers, is a joy to behold and impossible to copy to-day. Long, fine, narrow, sometimes nearly parallel flakes have been removed, producing a delightful impression of grace and symmetry[2].

The Solutrean industries with the laurel-leaf tool, etc. are different. They are a parenthesis in the succession Aurignacian-Magdalenian.

In Mousterian times there was no true bone industry, though bones were often utilised for anvils, etc. Nothing like awls or spatulae are found. As soon as we reach the Aurignacian deposits, on the contrary, we discover a bone industry, which becomes especially flourishing in Magdalenian times. There are awls, needles and spatulae, sceptres and lance-points. Some lance-points of Aurignacian age are split at the bottom lengthways, the split being probably useful for hafting purposes[3]. They should be carefully distinguished from the later Magdalenian notched-end bone lance-points, where the notched end is produced, not by splitting the base of the lance-point, but by carving out a long notch. A coarse form of eyed needle was found at

[1] It cannot be too strongly insisted on that all varieties of Aurignacian tools are found in Lower Aurignacian times; with the exception perhaps of the shouldered points of Font Robert, which developed at the end of Upper Aurignacian times. When it is said that an implement is typical of this or that period of Aurignacian times, for instance that the "beaked *burin*" is typical of the Middle Aurignacian, it merely means that in beds of this age they are exceedingly common, it does not mean that specimens are not occasionally found in both Lower and Upper Aurignacian beds.

[2] For discussion on this subject the reader is referred to the section dealing with the fracture of flint.

[3] The split-base bone lance-points (like the "beaked" gravers) are most common in the Middle Aurignacian age, and are often said to be typical of that period. It

Sergeac in deposits of Middle Aurignacian date by M. Didon, but the really finely-made eyed needles do not appear till later (Magdalenian) times. The same is true of the tool called either sceptre, arrow straightener or dress fastener.

In Mousterian times we get no art, no decoration, and none of the fragments of bone that littered the kitchens of the Mousterians ever carried even geometric patterns. Timid decoration as also bone and ivory sculpture appear with the rise of bone industry in Aurignacian times, leading up to the vigorous drawing of animals on the cave walls. But it is not till near the end of Palaeolithic times (Magdalenian) that there comes the great outburst of decoration on bones, weapons, etc.

Upper Palaeolithic Man.

Nor is the profound alteration in industries the only change that we find when we come to Upper Palaeolithic times. Man himself has changed, we have to do with a new race far more elevated in the scale. Palaeoanthropic Man with his beetling brows, his low receding forehead, his prognathous jaw, and shambling gait, has disappeared for ever; his place in Europe is taken by a true *Homo sapiens*, though different somewhat from ourselves to-day. This is Neoanthropic Man, called by French writers the Cro-Magnon race.

This race probably came over from North Africa, the early Aurignacian industry in France being seemingly derived from the Capsian culture of Africa. This Capsian culture fringes the southern shore of the Mediterranean, having possibly arrived from the east. With the great rise in intellectuality, which is shown both from the human bones, the industries and the art, we naturally find various local developments proceeding in different parts of the Aurignacian world. All the many sub-divisions of the Upper Palaeolithic era can be referred to Neoanthropic Man, and it is the work of the Prehistorian to trace their development. Their civilisations are profoundly different, and the human remains indicate distinct varieties which may be partly due

should however be remembered that it is always possible to find a few examples of them, in beds of Upper and Lower Aurignacian date. Beaked gravers would seem to be a French invention, they are not found in the Capsian layers in Africa.

to environment, partly to cross-breeding with other races. The skeletons found at the rock shelter of Cro-Magnon (Dordogne), form one of the varieties of Neoanthropic Man.

Even in the first (Aurignacian) period, we find evidence, from the occurrence of two skeletons at the Grotte des Enfants (Mentone), of the presence of another race having negroid characteristics. These people do not seem to have spread to any great extent in the Aurignacian world, though their influence may have had a wider scope than their distribution.

The race of the second period (Solutrean) arrived in France from the eastern extremity of Central Europe. Their cradle was on the edge of the Aurignacian world; many think it was the plain of Hungary, others maintain it was further east, possibly in Asia, Hungary being only an intermediate halting place. They swept into France like a flood, impelled by unknown causes. They were not a vast horde being comparable, perhaps, with the Helvetians whose movements gave Caesar such trouble. It would not seem however that these people really displaced the older Aurignacian folk in France. Not only are many of the skeletons of Solutrean age found in that country of the true Aurignacian type, but also large mountainous areas such as the Pyrenees were never penetrated by the Solutrean culture. Was it the discovery of the pressure flaking, enabling the fine lance-point (laurel-leaf) to be formed, that made it possible for this people to dominate for a time the earlier folk in France, though their small numbers destined them to be in turn swamped by the older culture that had meanwhile developed further, in areas where Solutrean Man never penetrated? (Compare the Swedes in Russia in the ninth century A.D.)

The third period (Magdalenian) seems to have had its cradle in France, though modifying influences entered, probably from a more eastern focus of development; both culture and race were probably direct developments from the earlier Aurignacian people. Certain human remains, such as the "Chancelade Man," show a modification of the original Neoanthropic Man, whose anatomical features have been likened to those of the Eskimo of to-day.

Finally, in the fourth period (Azilio-Tardenoisean) we get

a modification of Neoanthropic Man driven westward from his cradle in the Mediterranean basin by the oncoming of broad-headed peoples of the New Stone Age. The industries seem to indicate that the influence of the early Neolithic civilisation had already in part arrived and had helped in the development of this last Palaeolithic culture.

Again, certain burials found in Central Europe show a mingling of races such as one would expect when the westward movement of the New Stone Age folk is remembered. This pressure westwards of the Neolithic forced the aborigines to migrate before them, and just as the Azilians were forced into France, a development of Palaeolithic people in the east, showing slightly different modifications from the Palaeolithic people in the west, was driven about the same time to the shores of the Baltic and into South Scandinavia, which had only just been freed from the ice-sheet. This was the Maglemose civilisation of Scandinavia, of the human remains of which we as yet know nothing. Harpoons typical of this civilisation have been lately found below the peat near Holderness in East Yorkshire; the southern limit, as shown by the finds of typical harpoons, being near Boulogne.

The Upper Palaeolithic era may therefore be divided into the following periods:

Azilian[1].

Upper, Lower } Maglemose in the Baltic areas.

Magdalenian.

Upper 6., Middle 5., Lower 4, 3, 2, 1. } Modern classification.

Solutrean.

Upper.
Lower.
Proto.

Aurignacian.

Upper, with, at the extreme top, the levels containing the points of Font Robert.
Middle.
Lower.
Transitional or Audi.

[1] The relation of the Azilian to the Tardenoisean culture will be dealt with in a later chapter.

The characteristic implements of these sub-divisions are:

Upper Azilian.	Flat stag's horn harpoon pierced by a lozenge-shaped hole at the base.
Lower Azilian.	Same implement with a round hole at the base.

(Painted pebbles when they occur are characteristic of the Azilian age. These will be described in their due place.

In Maglemose deposits elegant harpoons are often found quite well decorated, but further finds of this age are required.)

Upper Magdalenian.	M. 6.	Harpoons with a double row of barbs.
Middle Magdalenian.	M. 5.	Harpoons with a single row of barbs.
	M. 4.	First appearance of primitive type of harpoons, barbs hardly projecting.
Lower Magdalenian.	M. 3. M. 2. M. 1.	No harpoons, but various lance-points differently decorated.
Upper Solutrean.		Single-shouldered points showing characteristic Solutrean pressure flaking, and narrow "willow-leaves."
Lower Solutrean.		"Laurel-leaves" equally showing pressure flaking.
Proto-Solutrean.		Proto-types of laurel-leaves. Implements showing pressure flaking at their points, etc.
Upper Aurignacian.		Single-shouldered points of Mentone and Willendorf, and double-shouldered points of Font Robert at the very top, the whole characterised by Gravette points.
Middle Aurignacian.		Split-base bone points, keeled scrapers, beaked gravers, also abnormal quantities of shallow notched blades.
Lower Aurignacian.		Châtelperron points derived from Audi points.
Transitional.		Audi points and Mousterian tendencies in the whole industry.

Distribution of Upper Palaeolithic and Azilian Stations.

Upper Palaeolithic stations are to be found in many parts of Europe, and are especially numerous in France. The following lists are not at all exhaustive; they are only intended to give a general idea of the distribution.

For further information M. Déchelette's book, *Manuel d'Archéologie préhistorique, Celtique et Gallo-Romaine*, or the inventory of the Dordogne deposits by Delage of Limoges,

or *El Hombre Fósil* by Dr Obermaier, should be consulted. Localities marked with an * are those which are described elsewhere in this book and a section given. The sign † after the epoch or the name of the locality means that human remains were found in layers of the epoch at that locality. The sign ‡ means that not only were human remains found, but that they were interred in ceremonial burial. The numbers after † or ‡ refer to the number of skeletons found; where no details are given after † there were only fragments found; if none are given after ‡ an entire skeleton was found buried.

North Spain[1].

Aitzbi - Tarté (Landarbaso) (near San Sebastian)	Magdalenian (M. 6).
Altamira (near Santander)	Upper Solutrean, Lower Magdalenian.
Camargo (Puente-Arce, near Santander)	Aurignacian†, Solutrean, Magdalenian, Neolithic.
Castillo* (near Santander)	† in Lower Magdalenian.
Cobalejos (near Santander, at Puente-Arce)	Mousterian, Solutrean, Magdalenian.
Cueto de la Mina (in the district of Llanes, Asturias)	Aurignacian, Solutrean, Magdalenian.
Cueva de la Paloma (near Soto de las Regueras, Asturias)	Lower Magdalenian (3 layers), Upper Magdalenian, Azilian, Neolithic and Metal.
Hornos de la Peña (near Santander)	Mousterian, Middle Aurignacian, Lower Solutrean, Magdalenian (M. 3), Neolithic.
Valle[2] (near Gibaja, Cantabria)	Magdalenian (M. 5, M. 6), Azilian.

West of France, north of the Pyrenees, other than in the department of the Dordogne.

Bruniquel[3] (Tarn et Garonne)	Magdalenian‡ (fragmentary).
Chaffaud (Savigné, Vienne)	Magdalenian.
La Chaise (Charente)[4] ...	Mousterian, Aurignacian, Magdalenian.

[1] The stations are arranged alphabetically.

[2] Near by is the deposit of Ojebar containing reindeer bones, but without trace of Man's habitation.

[3] There are various sites at Bruniquel.

[4] There are many other Upper Palaeolithic sites in the Charente. For example there is one near La Quina.

Cottés, Les (St Pierre de Maille, Vienne)	Aurignacian.
Coumba del Bouitou (Planche Torte, Corrèze)	Aurignacian.
Font Robert (Corrèze)...	Upper Aurignacian to Proto-Solutrean.
Font Yves (Corrèze) ...	Upper Aurignacian to Proto-Solutrean.
Lacave (Lot)	Upper Solutrean† (fragments of skull), Magdalenian.
Lacoste (Corrèze) ...	Aurignacian, Proto-Solutrean.
Montgaudier (Charente)	Mousterian, Solutrean, Magdalenian.
Monthaud (Angelin, Indre)	Solutrean with single-shouldered points.
Noailles (Champdron, Corrèze)	Upper Aurignacian.
Pair-non-Pair* (Gironde)	
Pis de la Vache[1] (near Souillac, Lot)	Mousterian, Magdalenian, Azilian, Neolithic.
Placard, Le* (Charente)	† in Magdalenian or late Solutrean.
Pont Neuf (Charente) ...	Aurignacian.
Reilhac (Lot)	Mousterian (?), Solutrean, Magdalenian, Azilian.

[1] Grotte du Pis de la Vache, commune of Souillac, Lot, in the park of the Château de Laforge.

Section at 15 metres from the entrance (after M. Viré):

A.	Rubbish	0·60
B.	Neolithic (polished axe) ...	0·50
C.	Sterile	0·10
D.	Azilian or final Magdalenian	0·15
E.	Sterile	0·10
F.	Magdalenian	0·70
G.	Sterile	1·50
H.	Mousterian	0·70
I.	Sterile	2·50
		6·85

France, Pyrenees district.

Arudy (Basses Pyrénées)	Magdalenian.
Aurensan (Hautes Pyrénées)	Magdalenian.
Aurignac, now quarried away (near St Gaudens, Haute Garonne)	Aurignacian‡ 17.
Bise, or Bize (near Narbonne)	Magdalenian.
Brassempouy* (Landes)	in Magdalenian†, 2 teeth.
Crouzade (near Narbonne)	Magdalenian, Azilian.
Enlène (Ariège)... ...	Magdalenian.
Gargas (Hautes Pyrénées)	Mousterian, Aurignacian (Lower and Upper)†, femur.

Gourdan (Haute Garonne)	Solutrean, Magdalenian†.
Isturitz (Basses Pyrénées)	Mousterian (?), Aurignacian, Solutrean, Magdalenian.
Lespugne* (Haute Garonne)	
Lorthet (Hautes Pyrénées)	Magdalenian.
Lourdes (Hautes Pyrénées)	Magdalenian†, fragment of skull.
Marsoulas* (Haute Garonne)	
Mas d'Azil* (left bank, Ariège)	
Mas d'Azil (right bank, Ariège)	Magdalenian (4, 5, 6), Azilian.
Massat (Ariège)... ...	Magdalenian, Azilian.
Sordes (Landes) ...	Magdalenian‡, Azilian.
Tarté (Haute Garonne)	Aurignacian.

East of France, north of the Pyrenees.

Bobache* (Vercors, Drôme)	
Bonne Femme, de la (near Bregnier, Mont de Cordon, Ain)	Magdalenian.
Châteauvieux-sur-Suran (St Martin du mont, Ain)	Magdalenian.
Colombière[1], La (near Poncin, Ain)	Proto-Magdalenian, Magdalenian.
Figuier (near St Martin-en-Ardèche, Ardèche)	Aurignacian, Solutrean.
La Goulaine[2] (Saône et Loire)	Magdalenian.
Grande Baille, de la (above Leymiat, Poncin, Ain)	Magdalenian.
Hoteaux[3] (Ain)	Magdalenian, 6 levels; ‡ in 6th.
Neschers (Puy de Dôme)	Mousterian with mammoth followed by a lava flow on which Magdalenian Man lived at a later date.
Salpétrière (near Pont du Gard, Gard)	Magdalenian.
Solutré* (Saône et Loire)	† in Aurignacian.
Sous-Sac[4] (Craz-en-Michaille, Ain)	End of Magdalenian or Azilian‡.
Volgu (near Rigny, Saône et Loire)	Cachette of very fine Solutrean "laurel-leaves," the largest nearly 35 cm. long by 8·8 cm. wide, by 9 cm. thick.

For notes 1, 2, 3, 4 see next page.

Eastern France

Arlay (near Lons-le-Saulnier, Jura)	Magdalenian.
Balme-d'Épy (Jura) ...	Magdalenian.
Châtelperron (Allier) ...	Lower Aurignacian.
Clucy (near Salins, Haute Marne)	Magdalenian.
Farincourt (Haute Marne)	Magdalenian.
Hommes, Les (Yonne)...	Magdalenian† (3 skulls).
Loye, La (near Montbarrey, Haute Marne)	Magdalenian.
Mesnay (near Arbois, Jura)	Magdalenian.
Roche Plate (St Mihiel, Haute Marne)	This site links the Magdalenian of Belgium with that of France.
Trilobite, Le* (Arcy-sur-Cure, Yonne)	
Veyrier (Haute Savoie)	Magdalenian.

Northern France.

Amiens district	Aurignacian, Solutrean, Magdalenian.
Muids, Le (Loiret) ...	End of Magdalenian and Azilian.

[1] Section of La Colombière, Ain:

1.	Superficial deposits. Evidence of former Magdalenian layer	·30
2.	Sterile layer	1·00
3.	Proto-Magdalenian, containing engraved pebbles and bones	·50
4.	Sterile layer	·10
5.	Rare Proto-Magdalenian culture in fine sand	·45
6.	Sterile layer with remains of small animals	·50
7.	Sands with very rare Proto-Magdalenian implements ...	·45
8.	Sterile basal layer. Stratified sands, etc.	1·10

It should be noted that the industries at La Colombière are probably developed Aurignacian equivalent in time to the Solutrean, which culture never penetrated the area in which La Colombière is situated.

[2] Goulaine. This station has yielded the largest Upper Palaeolithic tool found, a flint scraper or anvil, carefully chipped round the entire curved edge, and weighing 4½ pounds.

[3] At Hoteaux in the ceremonial burial in the sixth Magdalenian level the right thigh is where the left ought to be and vice versa, therefore the flesh must have been removed elsewhere and the bones reburied here. The person buried must have been from 16 to 18 years old, cephalic index was 77·29; face destroyed.

The fauna in order of abundance was: reindeer, ibex, stag, wild boar, marmot, beaver, hare, cave hyena, elk, carnivora, birds.

The industry consisted of: flint implements, eyed needles, bone lance-points, two sceptres (one beautifully engraved).

[4] Sous-Sac. The fauna here consists of: stag, roebuck, goat, boar, ox, etc.

The industry consists of roughly made implements with worked stag's horn. There is a skeleton in the oldest layer of the cave of an old person, long-headed (70·27).

France, Mentone district.

Baousso da Torre ...	Aurignacian† 3.
Barma Grande	Aurignacian† 6.
Cavillon	Aurignacian†.
Enfants, Des*	in Aurignacian† 4, also two negroid Aurignacian skeletons.

France, the Dordogne.

Badegoule (near Sous-le-Roc, Bersac)	Solutrean†, Magdalenian.
Bourdeilles (near Brantôme)	Upper Aurignacian, Solutrean.
Cap Blanc	Lower Magdalenian‡ (M. 3).
Cazelles	Magdalenian.
Champs-Blancs, or Jean-Blanc	Solutrean, with shouldered points and "laurel-leaves"; Lower Magdalenian.
Chancelade†, Raymonden (Perigueux)	Magdalenian‡.
Combarelles	Magdalenian.
Combe-Capelle	Abri {Solutrean (2 layers). Aurignacian‡ (3 layers). Terrace {Mousterian. Acheulean (?).
Cro-Magnon	Aurignacian† 5.
Excideuil	Solutrean, Magdalenian.
Eyzies, Les (5 rock shelters, including Audi, and the classic station of Les Eyzies)	These stations between them yield Mousterian, Aurignacian, Solutrean, Magdalenian† 5. The deposit at the castle contains M. 5 and 6.
Ferrassie, La*	
Gorge d'Enfer (several Aurignacian, Solutrean, Magdalenian sites).	

Note.—At the rock shelter containing the bas-relief of a fish is found Middle Aurignacian, Upper Aurignacian, Sterile. Few flakes (? age).

Gravette, La	Upper Aurignacian.
Grèze, La	Aur. (?), Upper Solutrean, Magdalenian.
Laugerie Basse*	
Laugerie Haute... ...	Solutrean‡, Magdalenian, Azilian.
Laussel	Acheulean, Mousterian (Lower, Middle and Upper), Aurignacian (Lower and Upper), Solutrean, Magdalenian.
Limeuil	Upper Magdalenian†, fragments of skull.
Liveyre	Solutrean, Magdalenian.
Madeleine, La	Magdalenian† (M. 4, 5, 6), Azilian.
Masnaigre	Middle Aurignacian, Upper Aurignacian with Font Robert type of points.

Mège, Abri (near Javerlhac)	Middle Magdalenian (M. 5).
Mouthe, La	Mousterian, Aurignacian, Magdalenian† (one tooth, one vertebra).
Rebières (in the valley of)	Aurignacian.
Rey	Solutrean, Magdalenian.
Ruth, Le	Aurignacian, Solutrean, Lower Magdalenian.
Sergeac (several sites) ...	Mousterian, Aurignacian, Solutrean, Magdalenian.
Souci	Upper Magdalenian.
Teyjat (near Javerlhac)	Middle and Upper Magdalenian (M. 5, 6).

Mediterranean basin.

Spain, North Africa, Italy, Greece.

In these regions we only find the Capsian facies of the Aurignacian culture. In Italy there are some dozen localities, including the cave of Romanelli, Otranto, which show some poor wall engravings of horse[1].

A definitely Palaeolithic, probably Aurignacian, graver was recognised by M. Breuil in the University Museum at Manchester, it is labelled as coming from the Piraeus.

Many Aurignacian tools come from Tebessa on the frontiers of Algeria and Tunisia.

Much of the area bordering the Mediterranean affords evidence of Azilio-Tardenoisean culture.

England and Wales.

Cae gwyn Cave (Carmarthen)	Upper Palaeolithic.
Cresswell Crags (Derbyshire)	Lower and Upper Palaeolithic.
Ffynnon Beuno (near St Asaph, North Wales)	Upper Palaeolithic.
Kent's Hole (Torquay)	Lower and Upper Palaeolithic.
King Arthur's Cave (Wye valley)	Upper Palaeolithic.
Mendips, Burrington Combe, Cheddar, etc.	Upper Palaeolithic† (human remains). (A Magd. 6 (*b*) harpoon from Burrington.)
Paviland (South Wales)	Mousterian, Aurignacian† (Lower, Middle, Upper), Proto-Solutrean.
Thetford and Ipswich ...	Upper Palaeolithic.
Victoria Cave (Settle) ...	Azilian, Early British.

[1] See Mochi, 1912.

Scotland.

Oban ... ... Azilian.

Belgium.

There are several localities containing layers of Upper Palaeolithic age mostly in the valleys of the Meuse and Lesse, such as:

Furfooz	Magdalenian.
Goyet	Magdalenian.
Spy	Mousterian ‡2, Lower Aurignacian, Upper Aurignacian, Proto-Solutrean.
Trou de Chaleux ...	Magdalenian.
Trou Magrite	Mousterian, Lower Aurignacian, Upper Aurignacian.

Countries to the east of pre-war France[1].

Stations of Aurignacian age are found in Germany, but according to R. R. Schmidt there are only three real Solutrean stations in Germany, and fourteen Magdalenian. These are mainly along the Danube and Rhine.

Germany.

Andernach (north of Coblenz)	Magdalenian† (child's teeth, etc.).
Bockstein (S. E. Stuttgart)	Lower Aurignacian, Upper Aurignacian, Lower Magdalenian, Upper Magdalenian, Neolithic.
Klause (several sites) (Neu-Essing)	Acheulean, Mousterian, Solutrean‡, Magdalenian, also tooth in Acheulean layer.
Obercassel (near Bonn)	Lower Magdalenian‡.
Ofnet (Bavaria)	Aurignacian (Lower, Middle, Upper), Solutrean, Magdalenian (Upper), Azilian with ceremonial burial of Azilian skulls.
Sirgenstein[2](Württemberg)	Mousterian, Aurignacian, Solutrean, Magdalenian.
Thiede (near Brunswick)	Doubtfully Upper Palaeolithic.
Wildscheuer (near Wiesbaden)	Magdalenian.

[1] It may be noted that the Aurignacian and Solutrean civilisations have not yet been found in the Alps.

[2] At Sirgenstein, according to Professor Sollas, the section is as follows:

Recent.
Upper Magdalenian, (*a*) with bones of *Lagomys pusillus*.
Lower Magdalenian, (*b*) with bones of *Myodes torquatus*.
Solutrean.
Upper Aurignacian.
Middle Aurignacian.
Lower Aurignacian.
Upper Mousterian, (*c*) with bones of *Myodes obensis*.
Lower Mousterian.
Tertiary.

Austria and Hungary (pre-war).

Ballahöhle (near Miskolcz)	Aurignacian (?), developing into Solutrean that later invaded the west (?); † skeleton of an infant.
Brünn (Moravia) ...	Aurignacian (?) mixed with Proto-Solutrean elements (?); † male skeleton buried with ivory statuette; elsewhere part of female skull.
Gudenushöhle	Mousterian, Magdalenian† (one tooth of a baby).
Krems (Lower Austria)	Middle Aurignacian.
Kulnu	Special type of old Magdalenian.
Předmost	Aurignacian, developing into Solutrean that later invaded the west (?); † 20.
Šipka	Aurignacian (?), developing into Solutrean that later invaded the west (?); † child's thick lower jaw.
Willendorf (Lower Austria)	Upper Aurignacian†.

Russia.

Mézine	Upper Aurignacian, developing into eastern equivalent of French Magdalenian (?).

Switzerland.

There are several stations in Switzerland along the French border, amongst the most important are:

Freudenthal (Schaffhausen)	Magdalenian†, fragments of skull and pelvis.
Kesslerloch (Thaingen)	Magdalenian†, collar bone.
Schweizersbild[1] (near Kesslerloch)	Upper Magdalenian (M. 6).

At Kesslerloch the Magdalenian layer also contained remains of obi lemming, and musk ox.

[1] According to M. Nuesch, the section at Schweizersbild is as follows:

Neolithic.

6. A layer of humous earth containing only bones of domestic animals. Depth, 40 centimetres.
5. Gray layer, containing remains of forest fauna and 27 human skeletons, of which five are pigmy. Depth, 40 centimetres.

Upper Palaeolithic.

4. Upper layer of rodents, poor in flint and containing a temporary fauna between that of the steppes and that of the forests. Depth, 80–120 centimetres.
3. Yellow layer with sub-arctic fauna of the steppes, and worked tools of Palaeolithic age. Depth, 30 centimetres.
2. Lower layer of rodents, very poor in flint, containing large quantities of bones of little tundra rodents such as: *Myodes torquatus*, *Lagomys hyperboreus*, *Arvicola nivalis*, reindeer, bison, etc. This layer corresponds to the first Palaeolithic period of Switzerland. Depth, 50 centimetres.
1. Moraine bed of the fourth glaciation formed almost exclusively of pebbles, containing neither fossils nor worked flints.

Alsace.

Achenheim. Five miles west of Strasbourg, on the east slopes of the Jura. According to Sollas in *Ancient Hunters* the section is as follows:

Upper Loess.

(*a*) Soil, Neolithic.

(*b*) Loess, weathered into loam above.

(*c*) Loess, weathered into loam above. In the loam Upper Aurignacian implements and traces of hearths; near the base of the loess, first bones of small mammals and then the chief bone layer which contains, amongst other animals, mammoth, reindeer, *Rhinoceros tichorhinus*, and bison; at the base, Mousterian implements and hearths.

Lower Loess.

(*d*) Loess weathered into loam above. In the loess an Upper Acheulean *coup-de-poing*.

(*e*) Loess weathered into loam above. In the loam, hearths and rudely-worked flints.

(*f*) Loess weathered into loam above. At the base a rude flint scraper and bones of reindeer.

(*g*) Red fluviatile sands.

The fauna of the lower loess includes reindeer, auroch (*Bos primigenius*), beaver, red deer, roedeer, and cave hyena.

Origin and distribution of the Upper Palaeolithic Industries[1].

The time is long past when a simple evolution in the civilisation of mankind was a tenable theory; that is to say an evolution in which the phases were identical in different districts, and followed each other in a steady and logical sequence. With the spread of research into more distant areas both analogies and distinct differences are traceable in the evolution of the industries found in the various deposits. It has become increasingly evident that what was taken at first for a continuous series, due to an evolution *in situ* of a single people, is on the contrary, the

[1] The whole question of the origin and distribution of these industries has been most admirably discussed by the writer's friend and teacher, Professor Breuil of Paris, the most learned living authority on this subject. In the following pages on the Upper Palaeolithic the writer has borrowed largely from Professor Breuil's illuminating, though very condensed, monograph read before the International Congress of Anthropology at Geneva, session 14.

result of the successive collaboration of numerous peoples coming into touch with one another, either by purely industrial or commercial influence, by a gradual infiltration, or by a rapid and warlike invasion of foreign tribes. Europe, and above all Western Europe, is a *cul de sac*, and so it is possible to trace from the remains of their industries the various human waves that arrived from the east or the south, driven by unknown impulses. Whilst on one side the plains of the Danube and of Central and Southern Russia were largely open to the east, Western Europe possessed another entrance, and received various African influences by way of Spain and the Italian peninsula, with its prolongation Sicily.

The direction of human migrations into France during the end of Pleistocene times is the same as that of its fauna, and it is not until the climatic conditions become those of to-day, that we find a Baltic or northern element. All the exterior influence apparently came from the south and east.

Modern research has divided Europe into two Palaeolithic provinces, each with a fairly distinct evolution, the one can be called Atlantic, the other Mediterranean[1]. The one extends over the whole of Central and Western Europe, from the borders of Poland to the borders of the Pyrenees and Cantabria. The other includes the greater portion of Provence, the Spanish peninsula (except the Pyrenean and Cantabrian regions), the Italian Peninsula, Sicily, North Africa, and doubtless the Phoenician coasts. As regards the east we must wait for more precise information before we can speak definitely.

It cannot be said that the Upper Palaeolithic folk in any of these districts are derived from the Mousterian or Lower Palaeolithic people of Western Europe; it is rather a question of invasions of peoples much more elevated in the scale of races and civilisation than their Neanderthal predecessors. The industry of l'Abri Audi indicates a stage in which the Mousterians and the forerunners of the Upper Palaeolithic folk were living contemporaneously in France. This in no way indicates a transition in the evolutionary sense between their industries. The discovery at Montière (Somme), by

[1] All the Lower Palaeolithic industries in both Atlantic and Mediterranean regions have a great mutual resemblance and are sometimes identical.

M. Commont, under a Mousterian level, of blades in some cases retouched in a manner recalling the primitive Aurignacian of Périgord, makes one think that the first waves of the new civilisation penetrated westwards much sooner than was previously thought. At Le Ruth in the neighbourhood of Moustier, which also contains deposits of Aurignacian, Solutrean and Lower Magdalenian ages, Mr Lucas found large and slightly retouched flakes under a rather unusual kind of Mousterian level, a discovery which corroborates the observations of M. Commont. It may once more be insisted on that the existence of a level of mixed character though clearly post-Mousterian at l'Abri Audi (Les Eyzies) and at some other places in Périgord, does not necessarily prove that the Mousterians became gradually Aurignacians by their development. It is equally possible that these places represent a Mousterian culture altered in part by contact with tribes more clearly characterised as Aurignacian. M. Peyrony has discovered such a station of the early Aurignacian age at La Ferrassie (Dordogne) containing a much richer industry, though very similar in type, and traces have been found in other places in the same district.

The change in the human race and in industry was so marked at the coming of the Upper Palaeolithic people that the division between that age and the Lower Palaeolithic age should be considered as great as that between the Upper Palaeolithic and the Neolithic ages. The way by which the newcomers arrived cannot easily be traced, the Aurignacians certainly colonised almost all the borders of the Mediterranean and all Central and Western Europe. Ethnographic reasons and resemblances in the human types rather point to an African origin, but it does not seem likely that they came from Algeria. In any case we cannot think of an eastern origin, for the primitive types of the Aurignacian culture have not been found in Central and Eastern Europe.

CHAPTER IX

THE AURIGNACIAN AGE

The Aurignacian is the first civilisation of the Upper Palaeolithic period. As has been suggested it arrived in France from somewhere to the south, and rapidly swamped the Neanderthal race in Western Europe. The Aurignacian folk spread north as far as Britain, and eastwards as far as Russia; while both Germany and, of course, North Africa show stations of this age.

The Aurignacian (French Cro-Magnon) race is quite different from earlier Palaeoanthropic folk, being of a much more modern type with a non-receding forehead; its peculiarity is the association of a long head with a broad face. Two new cultures were introduced by this people; one, the manufacture of bone tools, and the other the practice of art, both on small objects, and on the walls of caves and rock shelters.

Aurignacian times are divided into three periods: Lower Aurignacian, Middle Aurignacian, and Upper Aurignacian.

Lower Aurignacian.

The Aurignacian culture is found over a very wide area, and to obtain a clear view of its character and development it will be convenient to begin with the stations of south-west and central France.

At the beginning of the period must be placed the industry of the rock shelter Audi, and that of Châtelperron. Audi has Mousterian tendencies, and Châtelperron, though clearly Aurignacian, cannot be separated by any great lapse of time from the Audi industry, judging by the flint implements found there. At the station of La Ferrassie layers are found which can unhesitatingly be recognised as intermediate between those of Audi, and those of Châtelperron, thus forming a clear link between the two.

The distinct note of the Aurignacian workmanship is much more apparent in stations where a level of slightly

later date occurs, and the flint implements present the beautiful trimming characteristic of this period. The blades are stout and big, with notches that are either single, opposite, or alternate. Keeled scrapers appear, though massive and carelessly made, and occasionally angle gravers with a transverse or oblique trimming are found. Real bone implements now appear, not merely utilised bones; we may especially notice the bone points (*Pointe d'Aurignac*) sometimes with a split base. The ivory statuettes of Brassempouy[1] are found in levels of this age. There are also rough, sometimes eyed, awls, arrow-straighteners, and polishers in bone.

Middle Aurignacian.

As the Aurignacian culture developed keeled scrapers became more numerous and diversified in type, the later ones tending to be longer than the early forms. The channelled trimming is long, narrow and parallel, and this kind of trimming is also found on various kinds of otherwise rather clumsy scrapers. By this date all the different kinds of gravers had been invented, the beaked graver first predominating, and afterwards the angle graver. The La Gravette points make a first appearance, and also a microlithic industry. There is a large industry in bone, and use is made of decorative art, line design, and fresco painting. In this Middle Aurignacian period the special Aurignacian trimming reached its highest development. Towards the end of the period signs of decadence appear.

Upper Aurignacian.

Many fewer flints are found in the Upper Aurignacian layers, but the work on the blades, which are long and narrow, is very good. The gravers are often numerous and of all types, prismatic, polyhedric or angled. The angle graver is either of the transverse or oblique type, the trimming being straight, convex or concave, the varieties of size and fracture being quite bewildering. La Gravette points, corresponding rather to a pointed knife blade, are found with a back blunted by vertical strokes, and there are large numbers of blades with the same lateral trimming but squared at both ends[2]; these blades vary from

[1] See Plate XXIX. [2] See note, page 73.

microliths to large and powerful tools. Certain of the La Gravette points have a basal side-swelling which changes the tool into a pseudo single-shouldered point, resembling the late Aurignacian single-shouldered point. The latter is common at Willendorf in Austria, and at Grimaldi in Italy, and is met with occasionally in all the deposits of the final Aurignacian period. The double-shouldered point is found at Spy, Font-Robert, and Laussel, associated with single-shouldered points and side by side with an early type of rough Solutrean "laurel-leaf." The bone implements recall those of early Magdalenian times; the pieces of bone or reindeer-horn are no longer split lengthwise after making a cross section, but the method of parallel grooves has been acquired; that is to say two parallel grooves were made along the length of a bone, after which the layer of bone between the grooves was split off. The decoration on these bone objects is sometimes very remarkable, and the human figure is often represented either in the form of statuettes, as at Grimaldi (steatite) and Willendorf (fine oolitic limestone), or in bas-relief, as at Laussel (limestone). There were also animals engraved or sculptured in caves, and the most developed figures of this period, incised on the walls of Gargas or of Hornos, recall the beginnings of Magdalenian art.

Geographical distribution and development.

The foregoing gives a sketch of the French development of the Aurignacian civilisation; and what is known of that of Britain, Belgium, Germany, Poland, Austria, and Cantabria appears to be similar. It is easy to distinguish between the Upper and Lower Aurignacian periods in Cantabria, the excavations at Willendorf and at Krems define the character of the Middle and Upper Aurignacian times in Austria, while the diggings at Sirgenstein reveal the position of the three Aurignacian periods in Württemberg. The various periods can be distinguished in Britain at Paviland.

A somewhat different state of things is found when we pass on to Tunisia. Here we have a very primitive Aurignacian civilisation, almost as primitive as that in the rock shelter Audi, though clearly defined as Aurignacian by the presence of numerous blades, which though large have been

transformed by trimming either into end scrapers or into angle gravers of a square transverse type, or else into big pointed knives, the edge formed by rather rough trimming. This industry is certainly in close relationship with the industry of Châtelperron. The large number of angle gravers, although of a very primitive type, and the neat blunting at the back of the blades, suggest a more modern phase, yet this phase is considerably more primitive as an industry than the French Upper Aurignacian, where the La Gravette points are smaller and more developed.

It follows from the above, that this so-called Capsian or Getulian type is similar in character to both the Châtelperron and La Gravette industries. In France these two are separated by the rich culture of Middle Aurignacian age, which from the point of view of development of the stone industry does not logically lie in the line of evolution between the Lower and Upper Aurignacian industries. It is therefore reasonable to suppose that a second African influence had come, perhaps by way of Spain, to modify the spontaneous development of the Middle Aurignacian culture. In this way the early types of the Lower Aurignacian tools reappeared though smaller and neater in form. It may be noted that the beaked graver so characteristic of the Middle Aurignacian times in France is completely absent in the Capsian industry of Africa.

Certain Phoenician stations are clearly Aurignacian in type, for instance, the station of Antélias produced keeled scrapers, angle gravers, some La Gravette points, and some scrapers usually to be found at the base of the Upper Aurignacian layers.

In the cave of Romanelli (Otranto) we find a very typical Aurignacian industry tending to the Upper Aurignacian type.

Further north we observe some interesting peculiarities that serve to establish relations between the Italian peninsula and Austria. The same Aurignacian single-shouldered points, derived from the La Gravette points, are found at Grimaldi, the island of Elba, in various deposits of north Italy, and in the upper layers at Willendorf, Lower Austria. The feminine statue of Willendorf[1] (Upper Aurignacian), of negroid type,

[1] See Plate XXIX.

strongly confirms the authenticity and age of the images of Baoussé-Roussé. At the same level Dr Lalanne found the bas-reliefs of Laussel, representing the same type of race, and with these carvings single- and double-shouldered points.

The finds at Krems in Austria correspond to a much more primitive phase of the Middle Aurignacian. The numberless microlithic stone implements resemble those which were collected in a station of the same age near Brive by the Abbés Bardon and Bouyssonie, the account of which is still unpublished. Little chips and thin blades deeply notched, the notches in some cases multiple, are found at Krems, and also at the base of the Aurignacian beds at Pair-non-Pair, and at a corresponding level in the Grotte des Enfants at Grimaldi.

If we follow the Aurignacian influence into Russia, we find five main localities where evidences of this culture are to be found. They are all more or less in the same latitude as Kieff, that is to say almost at the southern edge of the ice sheet at its maximum extension. They are:

Hontzi, in the government of Poltava.
Kostenki, in the government of Voronèje.
New Alexandria, in the government of Lublin.
Mézine, in the government of Tchernigov.
Kieff (Rue St Cyril).

The flint implements of the station of Mézine, shown by M. Volkow at the Société d'Anthropologie in Paris, in 1909, very much resemble in type those of the most developed Aurignacian period. Angle gravers are very common, though ordinary gravers are rather rare; microlithic implements are found which recall the types of La Gravette. Upper Aurignacian culture may have had a longer existence in this Eastern Province, at any rate judging from the objects in bone and ivory at Mézine the development was in quite a peculiar direction. Although there are small segmented *bâtons* which recall those of Spy, Brassempouy and Sergeac, and some very coarse piercers with a perforated head suggesting primitive needles (rather like the eyed bodkins of Middle Aurignacian age found at Blanchard), there is a school of decorative art which has no contemporaneous western analogy. There are plaques for bracelets and a

conical object called a bird by M. Volkow, both of which are marvellously chiselled with Greek key patterns. There are also long objects with a side furrow opposite a flat face. M. Volkow took them to be phallic representations; but on the contrary M. Cartailhac and M. Breuil agreed in thinking that these objects were completely degenerated statuettes, the final phase of steatopygous types after the Brassempouy model. The greater number of them have engravings on the flat side which are not decorative, but suggest the nose, the arms bent on the chest, and the hands joined, with a large genital triangle, the latter replaced by a rod in the feminine statuette which shows the least development of the hips. Some incisions on the neck indicate a chignon. In addition the region of the kidneys and waist is covered with small geometrical decorations, perhaps indicating tattooing. These ornaments so purely geometric in character and so advanced in decorative work, together with the chiselled mammoth tusk of St Cyril at Kieff, and with certain ornamented ivories of the early Solutrean station of Předmost in Moravia, are all the examples we possess at present of this eastern branch of the Upper Aurignacian civilisation, so remarkably endowed with original decorative talent. It would seem that its influence never extended to the west beyond Moravia, but it is likely that further discoveries will be full of surprise and the unexpected.

CHAPTER X

THE SOLUTREAN[1] AGE

In France layers containing Solutrean implements sometimes are found resting on beds containing those of Upper Aurignacian type. Solutrean industries are divided into: Proto-Solutrean, Lower Solutrean, and Upper Solutrean. All these industries are characterised by the appearance of pressure trimming. In the Solutrean type of pressure trimming thin flakes are taken off the face of the flint in a direction nearly parallel to the blade, a characteristic flaking which does not appear again till Neolithic times. This type of flaking is to be found occasionally in the topmost levels of the Aurignacian deposits whether in Belgium, Périgord, or at Solutré itself, and its appearance, either at the base or point of the tool, is often seen in the case of some of the Font Robert shouldered points from Font Robert itself or from La Ferrassie, or from Spy.

Proto-Solutrean.

The Proto-Solutrean period is remarkable for industrial impoverishment as compared with the preceding Aurignacian age. Samples of Proto-Solutrean tools are found in the Dordogne, at the Trilobite cave (Yonne), and as far as the Ardèche. The Trilobite cave near Arcy-sur-Cure, Yonne, is a very good place for studying the transition of the Aurignacian to the Solutrean culture. According to M. Breuil the succession there and at Solutré itself is as follows:

Trilobite Cave, Arcy-sur-Cure.

		Fauna
Proto-Solutrean	...	Amongst others: *Ursus spelaeus*, hyena, wolf, ox, mammoth, horse and reindeer are common.
Upper half of the Aurignacian period		*Ursus spelaeus*, *Hyaena spelaea*, *Elephas primigenius*, rhinoceros, bison or wild cattle, ibex, horse (common), *Cervus elaphus* and *Cervus tarandus* (common).

The tools are: *burins*, awls, scrapers, Gravette points (rare), bone lance-points, etc.

[1] The type station is Solutr[*é*]. Hence Solutr[*e*]an.

	Fauna
Lower half of the Aurignacian period	*Ursus spelaeus*, *Hyaena spelaea*, *Elephas primigenius*, rhinoceros, horse, *Cervus elaphus*, *Cervus tarandus*, chamois.

The tools are typical Aurignacian types with several beautiful Châtelperron points.

Solutré.

The deposits at the type station of Solutré are[1]:

Section A.	*Section* B.
·50 Humus.	·40 Humus.
·60 Solutrean hearths *a*, *b*.	1·30 Rubbish.
Heaps of horse bones of Aurignacian age.	·50 Solutrean hearths *a*, *b*.
1·50 Rubbish.	1·80 Rubbish.
·30 Aurignacian hearths.	·50 Heaps of horse bones of Aurignacian age.
2·00 Rubbish.	1·30 Rubbish.
·40 Lower zone of Aurignacian hearths.	·03 Aurignacian hearths.
	1·70 Rubbish.
5·30 metres.	7·53 metres.

Magdalenian industries were discovered at Solutré by M. Breuil, but they are very rare in this part of France. The horse bone layer contained Gravette and Font Robert points and is therefore of Upper Aurignacian age.

Although the opposite has been stated, industries in bone are never wanting in Solutrean levels in France. M. Peyrony has found them in levels of Proto-Solutrean, Lower Solutrean and Upper Solutrean ages at Le Ruth (Dordogne), and a series of lance-points and bodkins have been found at Monthaud (Indre). There are also worked bones at Solutré, at Laugerie Haute, at Placard, at Badegoule, and at Lacave, etc. In the province of Santander (Cantabria) bone tools are found both in the Middle Solutrean layer with "laurel-leaves" at Castillo, and in the Upper Solutrean level with shouldered points at Altamira. It is true however that the first two divisions of the Solutrean period show a great reduction in the skill and quantity of the bone work. There seems very little decorative art of any kind in Solutrean times. Certain bas-reliefs on stone from Isturitz have been declared to be of Solutrean age, as also are the curious small stone animal statuettes at Solutré. The bodies of these

[1] Abstracted from Déchelette.

animals are covered by minute punctuations, a further peculiarity; but any kind of art would seem to be exceedingly rare in Solutrean times.

General Characteristics.

The Proto-Solutrean stage is characterised by the introduction of rough attempts at a "laurel-leaf" tool; this type is found principally in Eastern Europe, France, Belgium, and probably at rather a later date in Britain. The Aurignacian "blow" trimming is still in general use, but the new pressure trimming makes a tentative appearance.

In Lower Solutrean times there is a rapid development of this culture over France, and the true "laurel-leaf" appears in profusion, being found from Poland to Hungary, to Bavaria by way of Moravia, and then in France, principally to the west and east of the central plateau, and thence as far west as Cantabria. There is also an industry in bone, but undecorated.

In Upper Solutrean times we still get "laurel-leaves" but the shouldered point reappears, probably developed from the French Font Robert point. This Upper Solutrean industry is only to be found in France south-west of the Loire; and as far south as Cantabria. The "willow-leaves" have become characteristically small and narrow.

Proto-Solutrean and Lower Solutrean.

There are undoubted Proto-Solutrean industries at Spy in Belgium and also in English stations. M. Commont has found a Proto-Solutrean level in the loams of Picardy, though without true "laurel-leaves." In the south of Spain M. Louis Siret has noted a few very small "laurel-leaves" collected at Las Perneras. If these objects have not slipped in from newer beds of Neolithic age, it is probably a case of importation from or imitation of the Solutrean culture in the north. It appears that the Solutrean culture is entirely absent east of the Rhone, in the Iberian Peninsula south of the Cordillera Cantabrica, in Sicily, in Algeria, and in Phoenicia. It is therefore not towards the south that we must look for its origin, as this industry was probably unknown in the Mediterranean basin, as well as in the Pyrenees. Proto-Solu-

trean culture seems to have come from the east of Europe, as is shown by the fact that diggings in Hungarian caves indicate a big development of Proto-Solutrean civilisation in that country, whilst up to the present time true Aurignacian culture has not been found there. Under the levels containing "laurel-leaves" made of rather thick chalcedony are beds containing far more primitive types, worked on both faces, the rough appearance and strong patination of which remind one of small degenerated *coups-de-poing* of Lower Palaeolithic or Early Mousterian age. Attempts have often been made to derive the "laurel-leaf" from an almond-shaped tool that has been refined and thinned, and to explain this distinctively Solutrean object as an evolution of a type of Acheulean implement. This evolution certainly did not take place in Central or Western Europe, and still less in the various districts of the Mediterranean province which have been actually explored, but it is not in the least impossible that this evolution may have taken place in other parts of the world, such as in Hungary or even further east in the Steppe Countries of Asia. We must recognise therefore that the origin of the Solutrean civilisation which has come to us from the east remains as mysterious as that of the Aurignacian, of which the birth-place was probably in the Mediterranean area. It has already been noted that the contact between the Mousterian and Capsian industries in South Algeria produced a culture somewhat similar to that of the Solutrean of the north, though probably in no way connected with it.

The Solutrean stations of Hungary have not so far yielded a bone industry, though bone implements abound at Předmost in Moravia, where MM. Kriz and Maska collected a small number of "laurel-leaves" and quantities of worked ivory, amongst which were objects decorated with geometrical engravings and a conventionalised human figure, the latter suggesting Russian influence. The male statuette of Brünn, if it be of the age of Předmost and not more ancient, appears to be a prolongation of the Aurignacian artistic technique. Taking the industry of Předmost as a whole, it indicates a centre of the developed Aurignacian culture which has adopted in a certain measure the Solutrean workmanship for the flint tools.

Upper Solutrean.

Up to the present no fully developed Upper Solutrean station has been noted in Central Europe, nor indeed to the north of the Loire and the central plateau of France. The deposits which are actually known to contain Solutrean shouldered points are all situated between the Loire and the Cantabrian Pyrenees. The one most to the N.W. is in the deposits of Monthaud (Indre), whilst numerous samples have been found in the regions of the Charente, Périgord, and Chalosse. The deposits of Placard alone have furnished us with more than five thousand specimens, either fragmentary or complete. In the province of Santander, M. Alcalde del Rio has discovered these implements in the cave at Altamira.

This Solutrean shouldered point does not seem to be an evolution of the original "laurel-leaf," though unsymmetrical "laurel-leaves" having bases forming a sort of notch are found in a deposit at Monthaut (Landes) and at Bourdeilles an actual sequence has been claimed. At Monthaut there were a few primitive single- and double-shouldered points without any Solutrean technique, tools which seem to have been borrowed from an Upper Aurignacian collection of the type of Font Robert[1]. May we not therefore infer that the single-shouldered point which had been already created by the Upper Aurignacians (Willendorf, Grimaldi, Italy, Dordogne) had been copied by the newcomers from some tribes continuing this design in regions to which the Solutrean invasion had not penetrated?

During the excavations of Dr Fabien Arcelin at Solutré, in 1907, M. Breuil was able to demonstrate the existence of two very different Solutrean layers; the one poor in worked bones and gravers, but with large "laurel-leaves"; the other rich in small fragments of worked bone, gravers, laurel and willow-leaves which are long and worked only on a single face.

So far the excavations in the French Pyrenees have not brought to light any Solutrean stations, although one "laurel-leaf" has been found at La Crouzade, two or three

[1] Peyrony has also noted in Dordogne the occurrence of single-shouldered points in the Lower Solutrean derived directly, no doubt, from the Font Robert points.

at Gourdan, and an incomplete one at Montfort[1]. In spite of the Solutrean finds at Brassempouy and the environs of Dax, no parallels have been found in the mountain regions adjoining. Perhaps the Solutreans came down from the Dordogne on to the Gers and the Adour and followed the coastline to Santander without penetrating the chain of the Pyrenees. Was it perhaps in this latter region that the art and industry of the Upper Aurignacian race gave birth to the Magdalenian civilisation?

If we compare the bone-work of the two largest and most characteristic deposits, viz. Le Placard (Charente) and Lacave (Lot), we shall find it completely different, though at both localities it shows equal skill. The bone industry at Placard with its numerous bodkins, the heads of which are ornamented with dainty little incisions, is quite unlike that found at Lacave, which is an Upper Solutrean station with Magdalenian worked bone tools. Even needles are to be found. Can we not infer from this that the Solutrean folk of Lacave were being influenced by Magdalenian tribes already living in the region of the Pyrenees and perhaps even as far north as Montauban? At the same time the Solutreans in the Charente, further from this southern cradle of civilisation, were developing in a direction similar to the previous Aurignacian race, though the workmanship of these Solutrean folk was much finer.

It has been suggested that the birth-place of the vast Aurignacian civilisation which spread all over France, round the Mediterranean, and as far north as Poland, was in North Africa, or even further east. Some elements of the Bushmen civilisation, and even that of early Egypt, may also have come from this cradle. On the other hand, the comparatively small Solutrean civilisation, the birth-place of which seems to have been at the extreme edge of the Aurignacian distribution, may have been a by-product of this Aurignacian civilisation influencing the older more distant Lower Palaeolithic or

[1] A new cave has just been described. It is to be found 18 km. S.E. of St Gaudens, near the village of Lespugne (Haute Garonne). The deposits yielded Magd. 6 *b*, Magd. 3–4 and a rather peculiar Solutrean, in which sometimes the base of the laurel-leaf is concave, sometimes symmetrically and sometimes not, the later forming a sort of single-shouldered laurel-leaf. It is still true, however, that the Solutreans very rarely managed to penetrate into the Pyrenees.

Mousterian peoples, amongst whom further east the Aurignacians never spread. Certain mixed characters in some human remains that have been found seem to point to this. Again the "laurel-leaf," the characteristic tool of Solutrean times, may well be thought of as having been developed by these Aurignacian newcomers in contact with the Lower Palaeolithic or Mousterian people either from a degenerated *coup-de-poing*, or perhaps even from a Mousterian point. It was the manufacture of these long lance-points that enabled the Solutreans, who seem in other respects to have been inferior to the Aurignacians, to invade the latter, and for a time to dominate them.

On the other hand, this domination seems to have lasted only a short time and the Solutrean folk seem never to have been very numerous nor to have had a very wide distribution as compared with the previous civilisations. That the spread of the Aurignacians was from south-west to north-east, and that of the Solutreans from east to west, would seem to be demonstrated by the fact that the Aurignacian deposits in the east never show such a primitive type as the oldest beds in the west; the reverse being true in the case of the Solutreans, for we find thick deposits in the east of a very primitive Solutrean phase which has only a brief equivalent in the west.

CHAPTER XI

THE MAGDALENIAN[1] AGE

THE most ancient Magdalenian hearths often rest on Upper Solutrean layers containing shouldered points. If there be one thing certain in Prehistory it is that the Magdalenians are not developed Solutreans. They are indeed newcomers to the Solutrean country, and as unskilful in the art of working and flaking flint as their predecessors were excellent in it. Whether it be at the Grotte de Badegoule (Dordogne), at Jean-Blanc (near Combe-Capelle), at Laugerie Haute (near Les Eyzies), or at Laussel, whether in Périgord, or at Placard (Charente), an examination of the earliest Magdalenian levels reveals a radical change from the preceding age. The flint flakes are massive, heavy, badly made, often of poor quality, and badly trimmed, sometimes in an almost Eolithic manner; and chance tools, awls, notched tools, gravers, made of any kind of flake, are abundant. Very different from the beautiful flint, so finely flaked and trimmed and so carefully chosen, of Upper Solutrean age! Everywhere the Magdalenians are much less difficult to please in their choice of raw material than were the Aurignacians and Solutreans. On the other hand, the bone industry at once assumes a definite character, needles are never wanting, and lance-points are numerous.

Besides the type station of La Madeleine[2] there are rich deposits at Laugerie Basse, where the following is the succession[3]:

A. Mixture of tools derived from former layers of Neolithic, Robenhausen, Azilian, and Upper Magdalenian (double row harpoon) ages.

B. Layer containing harpoons generally with a single row of barbs; conventional decoration on the harpoons. Reindeer's bones very common (Middle Magdalenian).

C. Layer containing very primitive type of harpoon in bone, ivory, or reindeer-horn, with barbs hardly detached. Excellent art, both sculpture and engraving, with very little conventionalisation. Lance-

[1] Sometimes called Madeleinean from La Madeleine.
[2] Containing Magd. 4, 5, 6.
[3] Condensed from M. Peyrony's report.

points with single bevelled edge at the base are common. Horse bones as plentiful as those of reindeer (top of the Lower Magdalenian, or very base of the Middle Magdalenian).

D. Layer containing no harpoons. There is more sculpture than engraving (Lower Magdalenian).

Where did the Magdalenians come from?

Some striking analogies with the Upper Aurignacians of the Pyrenees, analogies in the cave art, such as the engravings at Gargas, the use throughout of hunting marks on bones, even the very large and flat form of the big lance-points of the Lower Magdalenian age, suggest a Pyrenean origin. Moreover this part of France seems to lack altogether the Solutrean industries. The poor quality and rarity of the flint deposits in this country would partially explain the unskilfulness of the Lower Magdalenian people in working this material. It would seem at any rate that the Upper Aurignacian race contributed in some way to the birth of the Magdalenian civilisation during the Solutrean episode[1]. This is only a conjecture, but something of the kind seems to be indicated by the evidence. At any rate, it does not seem that the Magdalenians, if they have a foreign origin, could have come from the Mediterranean basin, where traces of them are totally lacking[2]. One might argue for eastern elements in their formation, for the Magdalenian is not wanting either in Austria or Poland. Dr Obermaier has found some poorly furnished stations of Lower Magdalenian age in the Austrian loess; and in Poland not far north from Cracow, in the Grotto of Maszycka at Ojcow, was found a large series of worked bones covered with conventionalised decoration and with small longitudinal furrows, corresponding to some from a very ancient layer at Placard, which here follows after the lowest bed of Magdalenian age. These Ojcow caves contain also other deposits of Solutrean and Magdalenian ages.

The fact that at a rather more recent date a peculiar Magdalenian type, the origin of which is not western, is found towards the Ural mountains and in the Baltic

[1] La Colombière may be an instance of the transition in a non-Solutrean area.

[2] It is possible that influences from the Eastern focus of Magdalenian culture reached as far south as the eastern end of the Mediterranean.

provinces, suggests a Magdalenian centre towards the extreme north-east region habitable at that time; a centre which spread at first towards the west, and later towards the Baltic provinces and the Urals. We also cannot pass over the anatomical characteristics of the Man of Chancelade described by Testut, and his relation to the Eskimo of to-day. This indication suggests a new element which came perhaps from the depths of Asiatic Siberia, an element inheriting the artistic results attained by the Aurignacian people or their derivatives, results which were preserved in certain districts. But it is clear that the Aurignacian, Solutrean, and Magdalenian peoples had to a certain extent a common origin though their cradle is unknown. The common origin requires that the transition from one to the other should include in any case a considerable element of human continuity.

All Magdalenian beds are not identical in age. By reason of the diversities in the industries and the works of art it is possible to make numerous sub-divisions (at present six), valuable enough within restricted regions. These sub-divisions are founded on the types of objects that are easily recognisable, such as harpoons, lances, carved and engraved objects, certain original decorative motifs of temporary vogue, and other things which cannot be discussed in a few lines, and which need more careful excavations and more rigorous comparison. There are few stations where the Lower Magdalenian age is better represented than at Placard. The succession of beds there is as follows:

Neolithic.

Six or seven Magdalenian layers, the lower three of which are older than the appearance of even a prototype of the harpoon. In the lowest layer was a ceremonial burial of four skulls.

An Upper Solutrean layer with but few "laurel-leaves," and many shouldered points.

A Lower Solutrean layer with many "laurel-leaves," but no shouldered points.

A Mousterian layer.

The development may be traced from one bed to another, giving an idea of the length of the early Magdalenian, before the dawn of those flourishing artistic times, the works of which are the admiration of the world. Three thick, distinct

layers can be observed at Placard before the prototype of the harpoon appears, and before any work of art comparable to the classic series can be noted. Placard contains divisions Magd. 1, 2, 3, and a little 4 and 5. The culture of the early Magdalenian layers, distinguished by the types of lance-points, and by the decorative patterns, exists at least in part in Poland, in Switzerland (at Kesslerloch), in Périgord, in the Pyrenees, and in Cantabria. It is only in layers above these that the deposits with harpoons occur, harpoons that are at first rudimentary, then with single and after with double rows of barbs. This gives us five or six distinct Magdalenian divisions of which the industries are sufficiently recognisable, and the position exactly determined by well-proved stratigraphical superpositions.

The similarity between the sketches engraved on reindeer-horn from the two Lower Magdalenian levels of Placard, with those of the Polish cave of Maszycka at Ojcow, and with others of the corresponding layers at Castillo (Santander), at Solutré, at Périgord and at Poitou should be noted as showing the extent and uniformity of the Lower Magdalenian culture.[1] The zig-zag decoration broken by interlaced crossed lines which is characteristic of certain bones at Altamira, is found sporadically not only in Périgord and in Charente, but also in the caves of Arlay in the Jura. The ornamentation with deeply-cut dotted lines found in the old levels of Placard, is also seen in the most ancient strata of the same age at Kesslerloch in Switzerland. The spiral ornamentation of Arudy and of Lourdes has been found at Hornos de la Peña in a Lower Magdalenian bed, and similar ornamentation has been found in Périgord.

The analogy of the art in the various regions is naturally even more striking when it is a question of special objects, such as little sculptured figures and throwing-sticks, which are found from the Pyrenees to the Lake of Constance. However it should be noted that certain types are not very widely distributed. The silhouettes that abound in the Pyrenees, and are found in Périgord and Indre, are absent in Switzerland. The very special type of engravings of hinds on flat surfaces of bone, from the caves of Santander, cannot be paralleled in France and on the other hand the sculptures

[1] See Plate XXX, D, E.

on reindeer-horn from the French caves are not found in the Santander region, perhaps because stag's horn is rougher and harder, and lends itself less easily to artistic work. The bizarre engravings in the cave of Kostelik in Moravia have no parallel up to the present in the west. These few regional specialities must not make one lose the sense of the many common features which are found at long distances from one another, and which indicate similar fashions in industry and in art over wide areas.

Though less absorbing than the study of the works of art, the study of the industries in bone, stag's horn, and flint gives perhaps more important results. The stone industry is naturally determined by the material which the country furnishes. This industry is of considerable size in the countries rich in bands of big nodules of good flint, like Charente and Périgord; but undergoes a big reduction in size and beauty in the regions where flint is poor and not abundant, like the Pyrenees and Cantabria. In this last region the layers of Lower Magdalenian age only yield a small percentage of flint implements which are any use for serious study, but on the other hand a large number of rough rocks, quartzites, sandstones and limestones are utilised.

The history of the lance-points is very instructive. At the bottom of the Magdalenian layers lance-shaped forms are found, these forms are generally stout with a much enlarged base, projecting like a polisher. The sloping faces of the base are furrowed by lines, often arranged like wheat-ears or rays. Later on the bevel becomes more definite, or gives place to a pointed base, the shaft becomes rounded and lengthened, and is sometimes curved and furrowed with a fine dorsal groove. Then the lance-points diminish in size, and the points with a base having a simple bevel edge appear. They are often very short, with one, or more often two, deep lengthwise grooves opposite each other; and with them are the tiny lozenge-shaped points also with two deep lateral channels. Then comes the period of the lance-points with a base bevelled on both sides, and with these are found harpoons, having a single or more often a double row of barbs.

The reindeer-horn wands, with one side flat, and the

other rounded, have also an interesting development. The most modern are found with those harpoons which have a single row of barbs; the flat face is simply striated obliquely, the back often has conventional marks and carefully-made figures. In the case of older wands the back is ornamented with a row of bulbs, or decorated with incisions like the letter C, arranged in pairs back to back; these are of the same age as those with channels cut lengthwise. The oldest are short and lozenge-shaped, but without ornament. The bone points with a sculptured notch at the base are not all similar, those with a notch with parallel sides being slightly older than those in which the sides of the notch are divergent. All these tools do not belong to a single epoch in the Magdalenian age, but much remains to be done in separating these types with the necessary precision.

From their first appearance the harpoons are most useful and exact as fossils. They appear occasionally towards the middle of the Magdalenian age; the teeth are very small and numerous, like the teeth of the jaw of a fish, or the dentition of a shark, such as those found by Piette in the Pyrenean deposits. Generally they are made in bone, if in reindeer-horn the teeth are fewer, and not detached from the shaft; this harpoon is characteristic of Magdalenian 4. At this stage the teeth are sometimes on one side, sometimes on both, and occasionally there is a series of dorsal notches, and even of reversed basal barbs. Next comes the level containing fine harpoons, with a single row of very well carved barbs, the teeth at first small and still very close together, then less numerous, more powerful, very much curved and hooked; these are characteristic of Magdalenian 5. Occasionally they are found associated with little harpoons, the latter having two rows of barbs and being often in bone and very small; but the type of bi-lateral barb (characteristic of Magdalenian 6 *a*) comes into vogue in the next period, with probably two successive types. The type that M. Breuil believes to be the oldest is more elegant, with long sharp barbs bent backwards, that recall the latest of the preceding series of harpoons. The other harpoon has trapeze-shaped barbs more or less quadrangular, less artistic and elegant, but often covered with ornamental lines (characteristic of Magdalenian 6 *b*). It is

with the latter that the first flat stag's horn harpoons appear[1]; these are of the same general design, but are much thicker, and are found with the big polishers in stag's horn which replace chisels made from reindeer-horn and indicate the near approach of the Azilian age. Certain types of harpoons are less widely distributed than the preceding ones, and seem to be of a provincial character. Such are certain examples with a striated bevelled base, and a two-branched termination, something like a Y; these are found alongside the harpoons with a single row of barbs. In the level of the double-branched harpoons these implements are transformed into minute points in the form of a V with or without a middle shank, like those found at Le Souci. In the region of Santander the latest single barbed harpoons have in place of a basal side swelling a lateral hole through which the attachment line was passed. This type of harpoon with a pierced hole is wanting in France, but a harpoon from La Madeleine with a double row of barbs suggests it by the over-development of one side of a symmetrical basal bulb, on which the design of a perforation has been drawn, but not pierced.

In the Upper Magdalenian period in France, we have noted in the bone industry unmistakeable indications of the approach of the Azilian folk, who succeeded the Upper Magdalenian folk. Here it is interesting to study the later Magdalenian stone industry in more detail. Ever since the appearance of harpoons with a single row of barbs, an astonishing development of certain types of flint implements are found, recalling in some degree the Upper Aurignacian tools. Such are angle gravers, with a concave, transverse, or oblique trimming, also gravette points though less well worked. In the level of harpoons with a double row of barbs the contrast between the flint implements of Périgord and those of the Pyrenees is surprising. The blades found in the former region are long and but little trimmed; whilst in the Pyrenees the tools are rather short and carefully trimmed, especially the little round or square scrapers; there are also knife blades with a curved back, very different from earlier tiny Magdalenian blades with parallel sides. Is this simply a

[1] The association of flat stag's horn harpoons with the Upper Magdalenian beds was well demonstrated by Breuil in the upper beds of Sordes (Landes).

local fashion due to the different nature of the flint, or is the fact more important? Two stations very close to one another, Sordes and Rivière (Landes), give this interesting comparison. Both furnish harpoons with two rows of barbs, but Sordes has the Pyrenean industry in flint, and Rivière one similar to that of Périgord. The collection from these two places is in the Museum of Mont de Marsan. The deposit of Rivière contains objects from the Mousterian, Aurignacian, Solutrean and Magdalenian periods, but it was impossible to establish exact stratigraphical distinctions. The position of the layers excavated by Dubalen, shows that the actual level of the Adour, and consequently that of the neighbouring bank, is a little higher than it was in the Middle and Upper Palaeolithic periods. Between the deposits of Sordes and Rivière flows the Adour, an easy barrier for a fishing people to cross. In these two groups of the same age a new implement, viz. the parrot-beak graver, makes its appearance. This is a kind of curved and hooked graver, recalling certain angle gravers with an oblique convex trimming of the Lower Aurignacian age.

In this level, in the Dordogne, are also found single- and double-shouldered points, though they are very different from the Solutrean single-shouldered point and the double-shouldered point of Font Robert. These two implements with a few knife blades, and some small round scrapers, are, together with the late reappearance of a specialised form of keeled scraper, the only tools which, in Périgord, foretell the coming of a new development. In the Pyrenees, on the contrary, the flint implements and big polishers in stag's horn have already the look of post-Magdalenian tools, and their arrival indicates a real revolution. They are in fact the first signs of the Azilian culture, which was already penetrating this area.

CHAPTER XII[1]

AZILIAN, TARDENOISEAN, AND THE TRANSITION TO THE NEOLITHIC

THE type station where the Azilian or transitional industries were first recognised by M. Piette is at Mas d'Azil. The deposits are to be found on the left bank of the river Arise, just at the point where it enters the natural tunnel that pierces the hillside. The following deposits are found there:

Iron Age. 1 metre.	Stones fallen from the roof in which are the remains of Gaulish pots and glazed pottery.
	Bed of blackish clay in which is iron, and the bones of stag, pig, and sheep.
0·85 m.	Bed of stones fallen from the roof in which are polished axes, Neolithic pottery.
	Bed of blackish clay containing bones of pig, ox, sheep, stag, goat, and the remains of collars and amulets in alabaster, chipped flints, bone needles, bodkins, spatulae, barbed flint or bone arrow-heads, a bronze foundry, and a ceramic workshop, etc.
Early Neolithic. 0·60 m.	Cinders, and sometimes lenticular beds containing *Helix nemoralis*. Chipped flints, polished side-scrapers, sandstone polishers, bodkins, spatulae. The remains of stag, ox, horse, pig; also walnut and hazelnut shells, and plum and cherry stones.
Azilian. 0·65 m.	Reddish earth with little heaps of iron peroxide, and coal ashes. Stones fallen from the roof. Chipped flints, such as small round scrapers and knife blades. Flat harpoons in stag's horn perforated at the base, bodkins, collars of pierced stag's teeth, etc. Painted pebbles.
	No remains of reindeer bones, only broken bones of stag, roedeer, ibex, chamois, wild ox, horse, brown bear, pig, wild cat, pike, trout, badger, beaver, birds, snail, frog, etc. Remains of humans buried in red ochre.
0·10 to 1·25 m.	Fine schistose yellow stratified loam, that is found at the base of the next deposit.
Upper Magdalenian. 0·30 m. = M. 6.	Layer which has been in part remixed by water, in part black earth that has preserved even the most fragile implements. Needles in bone (not reindeer-horn). Harpoons (late type), sometimes even made of stag's

[1] For this chapter the writer is especially indebted to Prof. Breuil for his talks and publications.

	horn; rough polishers of stag's horn. Some of the round scrapers and knife blades are forerunners of the next later period. There is much engraving. Remains of reindeer occur, but are rare. Bones of stag, roedeer, ibex, chamois, horse, wild cattle, bear, wild boar, fox, wolf, lynx, hare. (Some of these may have burrowed in at a later date.)
1·50 m.	Fluviatile deposit of schistose yellow stratified loam, resembling loess.
Middle Magdalenian. 0·83 m. = M. 5.	Black earth with gravel, sand, and stones fallen from the roof, partly intact, partly remixed by water action. Charcoal is found. Needles, harpoons and chipped flints. Remains of reindeer abundant.
0·56 m.	Basal deposits of gravel with blocks of rock fallen from the roof. Native limestone of the tunnel.

The above is paraphrased from Piette, *Proceedings of Congress at Pau*, 1892.

At the end of Magdalenian times there seems to have been a catastrophic change[1]. All the fine art which we have learnt to associate with that period disappears; we cease to come upon beautiful engravings on bone and stone in the deposits, nor do we get any naturalistic paintings and engravings of animals on the cave walls. As far as art is concerned all that remains are a few geometrical designs, and the painted pebbles, the latter being pebbles from the river Arise near by, which have been covered with red smears, lines, and patterns. These painted pebbles have been classified into various types according to whether there are one, two, or more dots or bars on their surface. In some cases the edge of the stone is indicated by a red circle, and the vertical bars are crossed by horizontal ones, etc. Whether these types are real, and willed by the people who made them or not, is of course uncertain though probable. Dr Obermaier in his book, *El Hombre Fósil*, has compared these painted pebbles with certain "idol" signs from the third Spanish group and has thus suggested that some of the signs on the painted pebbles represented conventionalised human forms. Again they have been compared with the Australian "churinga." M. Piette suggested that they represented numerical signs, and they have been thought of as forming a sort of currency. The red paint on them is ochre mixed

[1] See Addendum Note on page 156.

with fat, and several palettes (made of pecten shell) have been found in the cave. At the grotto of Birseck, seven kilometres south of Bâle, in the rock near the village of Arlesheim, the rock on which the castle of Birseck is built, an Azilian deposit was found containing painted pebbles, all of which had been broken intentionally. Was this done by some enemy, or had it some sinister meaning? At La Tourasse there are painted pebbles on which are incrustations of stalagmite, a proof of their authenticity and contemporaneity with the deposits. Painted pebbles do very rarely occur in deposits of Upper Magdalenian age, as has been shown by the diggings of Dr Obermaier a few years ago in Bavaria and in Cantabria.

Painted pebbles occur in North Scotland in association with the keiss brochs. Examples of these which the writer has seen do not seem to bear any relationship to the painted pebbles of Mas d'Azil, etc. Their association with brochs denotes that they must be of late Celtic age (La Tène 4). There is a chance however that they may be older, and that the brochs may have been built on the sites of the older civilisation. With the pebbles were found big chipped stone tools, tines of stag, bones of penguin, elk, and a few reindeer. This latter seems to have been hunted in North Scotland as late as historical (mediaeval) times, if an animal of one of the sagas is to be identified as a reindeer. S. Reinach and others, however, have denied this identification.

The more the cave paintings are studied the more it is found that geometric designs occur throughout. They increase in numbers the further south we go, being rare in Périgord, commoner in the Pyrenees, much commoner in Cantabria, and very common at La Pileta in South Spain. They predominate in the so-called Neolithic paintings of the Andalusian sierras. But the older geometric designs are always associated with naturalistic pictures, while those of the Azilian and later periods either occur alone, or if in superposition with the older naturalistic art are always the latest. Such an instance occurs at the Cave of Marsoulas,[1] where we get a long red conventionally drawn barbed line, superposed on naturalistic polychrome paintings that are typical of the end of Magdalenian times.

[1] See Plate XX, A.

The revolution in culture characteristic of Azilio-Tardenoisean deposits is not confined solely to art; all the bone tools, needles and the like disappear, and instead of the lovely lance-points and harpoons, beautifully made from reindeer-horn, we only find inferior flat harpoons made from rough stag's horn. There is also a considerable reduction in the number of awls made from split bone, as well as of big bone polishers. With the exception of the flat type of stag's horn harpoon, which is peculiar to the Azilian period, the rest of the industry seems to be derived from poor types of Aurignacian tools. This applies as well to the industry in stone; there are some poorly made keeled scrapers and gravers, the latter almost exclusively transverse angle gravers at the end of a blade. Even the Châtelperron point returns, though smaller in size and in the form of a knife blade. The little geometric types of implement, the derivation of which is easily seen in the caves of Mentone, appear in considerable numbers in this Azilian period. These implements had occurred sporadically in France in Upper Aurignacian times, but had disappeared until the end of Magdalenian times, when they reappeared to herald the approach of the Azilian folk.

The questions at once arise: Who were these new folk? Who were their ancestors? Where do they come from? In order to answer these questions let us look to the Mediterranean area to the south of the Solutreo-Magdalenian civilisation which was described in the last chapter. Mention has already been made of one of the Grimaldi caves, Grotte du Prince, in connection with certain Mousterian problems. Let us examine another of these caves near by containing deposits of a rather later date.

Grotte des Enfants.

1, 2, 3. Little round scrapers and little single-shouldered points. Small notched implements. Two infant skeletons found by Rivière in these upper layers. Perhaps contemporary with the Azilian in France. In 2, skeleton of a woman too damaged for accurate determination.

4. Little geometric flints. *La Gravette* points, one bone stiletto, small flat scrapers, notched tools, end scrapers on a flake, gravers, single-shouldered points.

5. Oblique angle gravers on the end of a blade, scrapers, notched tools, Gravette points.
6. One bone stiletto, angle gravers, single-shouldered point, Gravette point.

[4, 5 and 6 perhaps contemporary with the Magdalenian in France.]

7. Ordinary gravers, angle gravers, Gravette points, notched tools, fairly large scrapers. No single-shouldered points.
8. Skeleton of a man of the Cro-Magnon type.
9. Fairly large scraper. Ordinary and angle gravers. Skeletons of *enfants*, a young man and old woman of a negroid type.
10. Bone points with split base. Scraper on a flake. Short blades.

[7, 8, 9 and 10 contemporary with the Aurignacian era in France.]

11. A few quartzites unlike anything at Grotte du Prince. Perhaps Mousterian or early Aurignacian.

Fauna at the Grotte des Enfants (after Boule).

Layers	L.K.	I.H.	Between burials	At upper Cro-Magnon burial	G.	F.	E.	E.D.	D.	C.	B.A.
Sus scrofa ...	×	×	.	.	.	×	.	×	×	×	×
Cervus capreolus ...	×	×	×	×	×	×	×	×	×	×	×
Cervus elaphus ...	×	×	×	×	×	×	×	×	×	×	×
Cervus dama ...	×	.	.	.	×	×	×	×	.	.	.
Cervus tarandus ...	.	.	.	.	.	×	.	.	.	×	.
Cervus alces ...	.	.	.	×	×	.	.	.	.	.	.
Capra ibex ...	×	×	×	.	×	×	×	×	×	.	×
Rupicapra tragus ...	.	.	.	×	.	.	.	×	.	.	.
Ox	×	×	.	×	×	×	×	.	×	.	.
Felis lynx ...	×	.	.	.	.	.	×	.	.	.	.
Felis spelaea ...	×	.	.	.	.	.	×	.	.	.	.
Felis pardus ...	×	.	.	×	×	.	.	.	.	.	.
Hyaena spelaea ...	×	×	.	×	.	.	×	.	.	.	.
Ursus spelaeus ...	×	×	×	.	.	×	×	.	.	.	.
Ursus arctos ...	×	.	.	.	.	.	.	.	.	.	.
Equus cabellus ...	×	×	.	.	.	×	×	.	.	.	.
Equus asinus ...	.	.	.	.	.	×	.	.	.	.	.
Rhinoceros merckii	×	.	.	.	.	.	.	.	.	.	.
Canis lupus ...	×	×	.	.	.	×	×	.	.	.	.
Canis vulpes ...	.	.	.	.	×	.	×	.	×	.	.
Lepus cuniculus ...	.	.	×	.	×	×	.	×	×	.	.
Arvicola	×	.	.	.	.	.	.	×	×	.	.
Arctomys marmotta	.	.	.	×	.	.	.	.	.	.	.
Mustela vulgaris ...	.	.	.	.	.	.	.	×	.	.	.
Mus	.	.	.	.	.	.	.	.	×	.	.
Beaver	.	×	.	.	.	.	.	.	.	.	.
Birds	×	.	.	.	.	.	.	×	×	.	.

In examining the succession of implements it will be clearly seen how starting with 11, a typical deposit of Capsian or Aurignacian age, we work up through Upper Aurignacian times till at the top the Azilian types are developed. We

are at first in presence of typical Aurignacian bone points, and the age corresponds with the final traces of *Rhinoceros merckii*, which occur in the two bottom layers. Reindeer occurs in the top layers.

The occurrence of reindeer as far south as Mentone indicates that the layers in which their remains occur must have been deposited at the time of this animal's maximum extension, i.e. during Magdalenian times. That is to say that the top layers at Mentone, with their Aurignacian implements which are developing into an Azilian industry, are contemporary with the Magdalenian age in France. None of the industries of Mentone are in the least Magdalenian, they range directly from the Aurignacian to the Azilian. This latter industry begins to develop at Mentone in beds clearly of Upper Aurignacian age, by starting with the single-shouldered point (Willendorf) and developing this tool into a small triangle; also a great quantity of small round scrapers occur. We can but admit that these deposits at Mentone correspond to the whole gradation of Upper Palaeolithic times in France. The reindeer can only have reached as far south as Mentone at its maximum extension, which corresponds to the Upper and Middle Magdalenian levels with barbed harpoons in France. Similar harpoons (themselves made of reindeer-horn) are found in association with reindeer at Valle (Santander), at Aitzbi-Tarté (Guipuzcoa), at Serinya (Catalonia), and at Castillo[1] .The upper levels of Mentone must however be correlated with the Upper Magdalenian layers of France, although the industry remains Aurignacian.

In Italy there are deposits of undoubted Aurignacian age, such as those of the cave of Romanelli (Otranto), where flint implements and worked bones characteristic of this period are found. There are several other Italian stations of more or less this age nearer the Alps. In Sicily we find remains of certainly two distinct ages. Some stations contain stout blades with one edge blunted, that though made of rough rock recall the Châtelperron point. Another series, such as that of Termini Imerese, appears to be much more recent, and can only be compared with the industry of the

[1] Reindeer has also been found here in the Upper Aurignacian, Solutrean and Lower Magdalenian levels.

upper levels at Mentone. We find similar round scrapers and little blades worked into knives; gravette points also occur, as well as two deeply notched horned flakes. Triangles are also found, which, as we see at Mentone, are derived by an evolution of the Aurignacian single-shouldered point. In other words this industry appears to be Azilio-Tardenoisean.

Crossing over to Africa we find a similar state of affairs. The oldest industry appears to resemble closely that of the Lower Aurignacian of France. Then follow industries which resemble the French Upper Aurignacian, and these latter transform themselves into a sort of Azilian industry. Dr Gobert has drawn attention to this gradual transformation in the rock shelters and mounds of the neighbourhood of Gafsa. There is a decrease in the number of the gravers, and in proportion as the levels approach those of Neolithic age, the more geometric microlithic implements occur. These latter differ a little from the triangular flints of Valle (Santander), or of Mas d'Azil (Ariège), or of Bobache (Drôme)[1]; but on the other hand they resemble closely those found at certain levels in Sicily, those found in Southern Spain, those found in the middens of Mughem (Portugal), and those found in the stations of Tardenoise and similar French sites.

A typical implement is the little Azilio-Tardenoisean graver already described in the chapter on "Flint and Flint Fracture." It is found in North Africa and everywhere in Western Europe, except in the Portuguese stations of late Tardenoisean age, though it occurs in stations of this age in the district of Limoges.

The trapeze-shaped form of implement is not known in the true Azilian period, though it can be traced from Tardenoisean to the dolmen age with but little change in type. The industries at Mughem, at Tardenoise and at Gafsa, do not seem to be truly Neolithic as neither domestic animals nor

[1] The chief site in the region of the tunnel of Bobache (Vercors) contains:
Extreme Upper Azilian.
Typical Azilian, with painted pebbles.
Upper Magdalenian, or even early Azilian.
Middle Magdalenian, with round harpoons in stag's horn, with single row of barbs decorated with conventionalised fish.

pottery occur. In other words these deposits are of Azilian age, although the industry differs slightly in form from that of Mas d'Azil itself. We are having to deal with two contemporaneous series, both of which are pre-Neolithic.

Southern Spain, though poor in remains, does show similar industries to our second (Mughem-Gafsa, i.e. Tardenoisean) series. Here however, as in the industries of series 1 (Mas d'Azil-Valle-Castillo), we find a quantity of snail-shells in the deposit. Müller and Baron Blanc have shown that these occur in similar deposits at Vercors and in Savoy. Morgan and Sarasin agree in placing the Egyptian station of Helouan as pre-Neolithic, and comparing it with a sort of Upper Palaeolithic. Although the Helouan industry differs from certain types of Tunisian industries in its lack of trapeze forms, it resembles that of Sidi-Mausur (Tunisia) by its knife blades and crescents. The surface station of Ras Beirut, in Phoenicia, seems also to contain cultures that are older than the true Neolithic. There are triangular microliths, little blades with both ends squared and a blunted edge, primitive arrow points with little basal notches that are similar to those at Helouan and little curved awls on the ends of blades that seem sometimes almost an exact copy of the French parrot-beaks, though these latter are made of course with the help of a graver blow. The trapeze, though rare, has been found in this station.

In the Crimea, on the other hand, the trapeze is remarkably abundant, where it is found associated with numerous little round scrapers, triangular microliths, knife blades that are finished off obliquely or squarely and which show sometimes little lateral gravers of the type found at the French station of Noailles, and the Russian station of Mézine.

A similar industry seems to occur at Ossowka (Poland), where all the characteristic types are found, as well as arrowheads with a concave base, that are certainly a more developed type. There are also double-shouldered points, and single-shouldered points that may be legacies from analogous types from the loess of Willendorf age.

It follows that round the Mediterranean there were at different dates various microlithic industries of flints in geometric forms. They are not very different in age, and

may merely represent stages in development. Some of these industries seem to be related to a developed Upper Aurignacian or Upper Capsian culture, while others on the contrary appear to be connected with the early Neolithic civilisation.

Microliths also occur in India, in the district of Banda and in the mountains of Vindhya, and in Ceylon.

Is there any connection between all these pigmy industries? Who knows?

The Portuguese middens of Mughem[1] and Cabezo d'Aruda are especially noted for the little trapezes that occur there. The absence of all pottery, and of all domestic animals save the dog, seems to point to its date being pre-Neolithic. Their geographical position, seventeen kilometres from the sea, presupposes big geographical changes to have come about since their formation, and they are to be correlated with the last upward movement of Western Portugal. Their age, in spite of the absence of extinct animals and the presence of the dog, might well coincide with some moment at the end of the Cantabrian or Pyrenean Magdalenian period. At Valle (Santander) the little triangular flints that occur are not identical with those of Portugal. The flint industry is remarkable in its variety; there are numerous forms of scrapers, generally round or square, and a quantity of angle gravers with a transverse trimming. On the other hand knife blades are rare, though abounding at Mas d'Azil and Sordes, but at the latter station triangular flints and gravers are rarer.

At Valle, which was examined by Dr Obermaier, the section is:

Azilian.
A layer filled with the shells *Helix nemoralis*.
Magdalenian.

Gravers are rare in the stations of the Landes which have been studied by MM. Lalanne and Daleau, but these places are rich in little triangles and small round scrapers, though they lack well-defined trapezes[2]. Stations with similar

[1] Skeletons have been found at Mughem. As at Ofnet there are a few brachycephalic skulls along with the dolichocephalic specimens. This is no doubt due to an early Neolithic (brachycephalic) admixture.

[2] Small round scrapers, awls and *burins* have also been found by M. Lalanne along the coast of the Bas-Médoc. Perhaps these too are of Azilio-Tardenoisean age.

industries are found in the lower Loire at Buttes de Rocher, and at Guérand (Loire Inférieure), etc. In some instances both trapezes and triangles are found, in others only triangles. The station of Muids seems in part of true Azilian age, since trapezes are lacking and angle gravers abound; and the middens of Torche (Finisterre) seem also to belong to this period. We find little round pre-Neolithic scrapers and small blades, but no polished axes, nor pottery. Though triangular flints have not been cited as occurring in these deposits, it may well be owing to lack of observation, as these small implements are easily missed; the harpoon also is absent, which is true for Portugal as well.

Flat harpoons are found at:

Castillo, Valle, Valley of the Miera	Santander.
Sordes	Landes.
Lourdes, Lorthet	Hautes Pyrénées.
La Tourasse, near Salies	Haute Garonne.
Montfort, Mas d'Azil, Massat	Ariège.
Reilhac	Lot.
La Madeleine, Laugerie Haute, Laugerie Basse, Souci, Longueroche	Dordogne.
Chaffaud	Vienne.
Victoria Cave, Yorkshire; Whilburn, North England; Kirkcudbright, South Scotland; Island of Oronsay, West Scotland; Inchkeith, Edinburgh; McArthur's Cave, Oban; Drumvargie, Oban	Britain.

The objects in bone resembling rough broad harpoons from the Swiss lake-dwellings, objects which are of Neolithic age, are totally different from the Azilian harpoons.

In England there are many stations where microlithic

flints occur and pottery is absent; some of these places are near the coast and some inland. Two typical stations of this age are the middens of Hastings and Sevenoaks. The Hastings microliths include the regular Tardenoisean types even to the graver. They are found in a light coloured sand high up on the hillside near the castle, filling cracks in the Wealden rock. The top of the hill was used in Roman times as a camp, and this explains the presence of pottery (some of which is of Roman age) that is to be found at the top of the middens. There is also a cave containing microliths in the Wealden rocks close by.

At Sevenoaks, on the Wildernesse estate, this microlithic industry is associated with a tumulus[1] where a body had been buried. The body had been laid on a prepared hearth of ironstone, which was then covered by tiny worked flints; these were fused together by the fires burned on the top. Afterwards when most of the debris of these fires had been removed, the whole was covered up with more ironstone and sand (brought from a good distance), and with worked flints.

The discovery is the only one of the kind in England; it would seem to have been the work of Tardenoisean Man.

In East Lancashire the Tardenoisean industry is found under a bog that is composed of different vegetation to that found in our own time. Trapeze-shaped tools are entirely absent from all these English stations, which correspond to the classic French station of Tardenoise, where of course the triangular types are found. This triangular type seems more ancient than the trapeze form; for we have already noticed that it is found unassociated with the latter in the Azilian deposits of Cantabria and France. The triangular type also occurs with painted pebbles and flints (certainly Azilian, though the graver is absent) in the stations of Savoy and of Vercors. This type was also found with the bones of lion and elk at Ofnet in Bavaria; though the tools are not very typical here there are collars made of stag's teeth that are identical with those found at Mas d'Azil. It was at Ofnet that the nests of skulls were found, the skulls being placed in concentric rings all facing west. They were those of old women, young

[1] A similar association has been found by M. Obermaier in Spain.

women and young men; the old women have many collars of stag's teeth and other articles of decoration, the young women have few ornaments, and the men none. Count Begouen has shown from a minute study of scratches and marks at the base of the skulls that these were decapitated. For what reason this decapitation took place, and why the skulls were thus decorated and placed in concentric circles facing west, is, of course, unknown.

At Istein (Baden) the fauna is Azilian, though the industry of microlithic blades is not geometric; small angle gravers and round scrapers are however numerous. The same is true for the cave of Hohlefels, near Nuremberg, and at the rock shelter of Sous-Sac (Ain).

Two sorts of industries have been found by Baron de Loé in Belgium. One of these that is found in the cave of Remouchamp is composed of little round scrapers, small angle gravers, and long microliths that take either the triangular or the knife blade form; there are no trapezes, and reindeer bones occur. Again the diggings at Zonhoven have brought to light two well defined geometric microlithic industries. The one comes from some depth below the surface soil, and the other from the surface itself. The first is entirely free from outside mixture, and is composed of long and round scrapers, angle and plain gravers, microlithic knife blades, and other little blades, truncated obliquely, that develop into little triangles. The upper industry from the surface is composed of Neolithic heeled arrow-heads, a flint blade from Pressigny, polished Neolithic axes of a late type, and Tardenoisean types of a late development showing examples of every gradation from the triangle to the trapeze. However, though these two industries are somewhat different in type and in time, the small industries of the upper one are so similar to the typical Tardenoisean stations that are not so far off, that they are probably of the same age. At the Tardenoisean stations true Neolithic objects never occur and the Pressigny blade, etc., at Zonhoven have probably been mixed in at a later date.

From these various facts we can easily deduce for our western region (it is obvious that these remarks cannot apply to the Mediterranean coast regions) a certain chrono-

logical succession of the microlithic industries, that represent the successive waves—each closely related to its successor—that were provoked by the approach of the Neolithic invasions.

Knife blades appear at the end of the true Magdalenian period; these were used possibly to make teeth for saws and were hafted probably in wooden frames; they develop in the Azilian stations in inverse ratio to the triangular geometric types, which are of course only a variety of knife blade. The final evolution of the little angle graver similar to the graver of the Noailles type is a little short thick-set triangular tool with a transverse trimming.

The real triangular type appears to come to its full development a little later than the Azilian period, and a little earlier than the full expansion of the trapeze form. This latter, though it does not supersede the triangular type, is the latest distinctive shape in this group in Western Europe. In Italy as well as in Murcia and Belgium, etc., we sometimes find a certain number of the Tardenoisean types surviving in the earlier deposits of true Neolithic age. In Italy the type generally tends to get larger and heavier, and often develops into rough forms of barbed arrow-heads. This transitional period is composed of both Azilian and Tardenoisean industries. It is impossible to separate these two industries in time, and it might be best to christen the whole transitional period Azilio-Tardenoisean. The Azilian is merely a fairly ancient and more localised stage of the period, the direction of advance being from south to north. This direction is shown by studying the occurrence of the flat harpoons that can be traced from Cantabria and the Pyrenees to Scotland, *via* Dordogne, Vienne, and England. It seems probable that the so-called Azilian finds at Oban are considerably later in time, though connected by culture with the French industry. The Tardenoisean period in France is the final stage, not far off in time from the earliest hearths of Neolithic age (pre-Campignian), which are found near Liège. This type is also characteristic of Tunisia and the Crimea, and appears to be the earliest industry there. However we look at the matter we are forced to search for the origin of these little industries in the south at some point in the Mediterranean basin. We can but suppose that the Neolithic peoples had chased before

them the tribes that inhabited these countries, and had driven them towards the north-west. It may be that other similar peoples had been pushed south, and had been able to colonise the vast regions of the African continent. In this connection the occurrence in the Soudan of little knife blades, crescents and trapezes, recalling the Tardenoisean types, should be noted. Polished axes are not found there.

There can be no doubt that the Bushmen preserved to a recent date an industry which was very similar to the European and North African Azilio-Tardenoisean culture, consisting of knife blades, little triangles, and little round scrapers.

Madame Crova mentions trapezes, triangles, crescents, and sharp edges associated with a beautiful industry of notched and winged arrow-heads from Cap Blanc (Mauretania), and at Kakimboa, French Guinea, two sharp little knives were found similar to those found in Dolmens.

But the Neolithic people not only invaded the west by the southern route, they took a northern route as well and drove the older folk before them. These latter migrating west from somewhere in South Poland, formed the Maglemose culture along the shores of the Baltic. They made no pottery and had domesticated only the dog. This however is also found in the true Azilian civilisation, as we find remains of the dog at Mughem, La Tourasse, and Oban. Harpoons of Maglemose age have been discovered below the peat in East Yorkshire, near Holderness, and as far south as Boulogne. It will be interesting if we are in the future able to demonstrate the presence of cultures due to the Azilians of France, west of the Pennines, as at Victoria Cave, Settle, and a contemporaneous culture due to Maglemose civilisation in the east.

The civilisation of this people is not similar to that of the contemporary French Azilian culture which we have already described.

They made long fine harpoons, and also engraved decoration on bones. These harpoons are similar to some found in Eastern Russia, and the style of the engravings on bone can be perhaps compared with certain semi-naturalistic rock engravings that occur in Norway.

Can we not suggest that these people were the final development in the eastern focus of the Palaeolithic people; just as the Azilians were of the Aurignacian people in the west?

At any rate the decorative art is different to that of the Magdalenians, though conventionalisation (often the human form) has been found. As for the animal figures their conception, though naturalistic, does not surpass the art of the Aurignacian engravings and is far behind the true Magdalenian art. It may well be that an Upper Palaeolithic centre had been developed towards Poland, parallel to that in the west, which gave birth to a culture corresponding to the French Magdalenian. This culture was developed by migratory folk along the shores of the Baltic, in proportion as these shores became habitable, and the pressure of the Neolithic peoples insupportable. At any rate the Maglemose people existed for some considerable time on the shores of the Baltic, before the arrival of the early Neolithic (Campignian) tribes that accumulated the middens along the coast of the sea which furnished them with edible shell-fish.

As a matter of fact, while the station of Maglemose itself belongs to the epoch of the pine and the Ancylus sea, the industries of Kunda and Ertebölle in Finland belong to the later age of the forest and the oaks—judging from their trunks already very old—and to the Littorina Sea.

The early Neolithic people (Campignians) owe nothing to their predecessors; they are true strangers. Already purely Neolithic, their later development was destined to give place to the later Neolithic period; meanwhile other Neolithic people had already colonised the Danube and Middle Europe.

ADDENDUM NOTE.

The change in culture corresponds with the change in climate which became warmer and more humid, permitting forests to abound in France. Is this due to small Earth Movements which caused the break through of the Straits of Dover and the Straits of Gibraltar? The consequent increase in sea area would regulate the climate, the short hot summers becoming cooler and the long cold winters warmer.

CHAPTER XIII

THE NEOLITHIC AND BRONZE AGES[1]

HARD on the heels of the Azilio-Tardenoisean civilisation came the true Neolithic people. The place of their origin is obscure, but some at any rate seem to have arrived from the east, importing a totally new culture. These people may have been partly newcomers and partly the old Palaeolithic folk *in situ* modified by this new culture. The birthplace of the new culture may have been at the head of the Persian Gulf (at that time much further inland than it is to-day) or in a more northerly locality, as far north even as South Siberia. It seems that we have to deal rather with a number of peoples held together by a common civilisation than with a single race, for skeletons of this period indicate a mingling of types. It is still a moot point whether or not all this differentiation took place before the arrival of the civilisation in the west, or whether part at least did not take place *in situ* in Western Europe, either from development from the older Palaeolithic races, or by development of the newcomers themselves. There is anyhow the result of such a differentiation in Western Europe, for the type round the Mediterranean basin is different from that which occupied the central zone of Europe, and this again is different from that which arrived at a slightly later date and occupied the northern area; and naturally hybrids were developed from these types.

It has been said above that we probably have to deal with a number of peoples held together by a common culture. This culture consisted of:

Agriculture.
The domestication of animals.
The manufacture of pottery.
The polishing of stone implements.
Later the discovery of metal smelting (this at a not much later date in regions rich in copper ores).

It is impossible to over-estimate the influence that agricul-

[1] This chapter only professes to give a few notes on this large field of study.

ture and the domestication of animals have had on human civilisation. Not only has it increased the density of population, but it has also produced a communal life, by concentrating people who have a mutual interest in flocks, herds, and land cultivation. The increase in numbers helped to exterminate the hunting population of the country, which must of necessity be few in number. The community life generated specialism which, in its early stages of growth at any rate, very rapidly accelerates the advance of civilisation. Specialism acts by separating the community into warriors, agriculturists, artisans, etc., the different professions being thus able to devote their whole time to their own subjects; for example, the agriculturist has not to fear for the destruction of his crops by enemies, as he is protected by the warriors. Again, in a community when a specialist concentrating on his work makes a discovery, whether in the nature of something new or an easier method of doing some branch of his work, the whole community acquires this knowledge and makes use of it. This leads to a large number of local developments owing to different advances of civilisation along various lines.

Neolithic peoples are generally thought of as always polishing their stone implements. This is not so. At any moment of the Neolithic age it is only a percentage of the implements which were polished, the rest being still chipped, and in early Neolithic times hardly any polishing was done at all. The earliest Neolithic industries in the south resemble those of the Azilio-Tardenoisean age, there being a large number of pigmy chipped flints along with developed flat trapeze-shaped flints. These were probably hafted in a wooden frame and formed what may be described as the teeth of a saw, or the working edge of a sickle. Some sort of a tool of the nature of a sickle is, of course, essential to an agriculturist. These early times were also characterised by the Campigny pick, and a sort of hatchet (Campigny hatchet), the straight working edge of which is made by the removal of two flakes on either side. Scrapers of all shapes and sizes abound. The next later stage is when tongue-shaped hatchets were frequently polished; these are known as "celts" and were often hafted, stag's horn being sometimes used for

the purpose. The true "celt" is more or less pointed at one end, tapering to an edge at the far end, which is transverse to the two sides. They are found both chipped, partly polished, and wholly polished. Polished specimens are often made from some rock other than flint, the idea no doubt being to produce a tough rather than a sharp tool. Polished diorite tools of this type have been tried experimentally for felling trees and are not unsuitable to the purpose. When they first appear they are lumpy and more or less circular in section towards the pointed end. At the end of Neolithic times they become much flatter and are beautifully made.

Origin of the Neolithic Civilisation.

It is generally considered that Neolithic Man arrived in Western Europe from the East, and the usual theory has just been given. There may have been several cradles which may account for the differences in the various waves that poured into Western Europe. It would at any rate seem certain from the discoveries at Anau, in Turkestan, some 200 miles west of Merve, and 3000 miles east of the south-east corner of the Caspian Sea, and at Susa, in south Persia, that a flourishing culture existed in these regions from very early times. Is it possible that as far back, perhaps, as Upper Palaeolithic times in Western Europe, the Neolithic culture developed in those areas in the Middle East which to-day are not very suitable for sustaining a dense population, but which then, just after the last glaciation, owing to the liberation of large masses of water vapour, could easily sustain a large population? Subsequent changes of climate would enforce migration and this would be, in part at any rate, towards the rich lands of the west.

Pottery.

It has been asserted that pottery has been found in certain Palaeolithic deposits, both in Belgium and England; it is, however, pretty certain that Palaeolithic Man never properly knew of, or made general use of, pottery. In Neolithic times, on the contrary, it was common, and often very well made: in fact an astonishing skill in technique is notice-

able, especially in the Mediterranean area. All the pottery is hand made, the potter's wheel not having been introduced into Europe until Middle Bronze Age times. But it was early discovered that clay alone dries, contracts and cracks, and must be mixed with something to render it porous and help the escape of moisture before firing. Again, if the clay be too greasy when fired it does not keep its shape. The material added was often of a sandy and micacious nature. In the north this addition was often not very fine, and gives the characteristic coarse appearance to the edge of a broken potsherd. In the south, on the contrary, the material added was usually very fine and charcoal was often used for the purpose. On firing, this gives a black pottery which can be burnished with a bone spatula. The whole art of firing pots properly is one requiring considerable knowledge; if free air is kept away a black pot results, but if oxygen is present the iron content of the clay oxydises and a red pottery results. In the well-known case of the pre-dynastic Egyptian pots with black tops the red part was fired in contact with the air which was not allowed to get to the tops.

Again, in the south, Neolithic Man actually attained to the use of a "slip," where a pot is made of fairly coarse material and fired, then dipped into fine clay, reduced to the consistency of thick soup, and again fired. The result is a thin but very fine outer layer. "Slip" occurs in the Neolithic cultures of Thessaly.

Pots are often decorated; in the north this is usually done with the thumb-nail or by some other simple method. In the south, including the Danube valley, the decoration is often beautiful work, being sometimes painted and sometimes incised. The incised work includes dots, zigzags, chevron pattern, etc., the lines are sometimes deeply incised and filled with a white material to show up the pattern. Sometimes the burnished surface of the pot is covered with slight wavy ripples. These elaborate decorations have enabled explorers to establish local sequences (cf. Wace's work on Thessaly). It should be remembered, however, that in various places Neolithic culture survived and developed during a period in which bronze had already been introduced elsewhere.

Habitation.

Three kinds of habitations are found in Neolithic times, depending on the region and the local circumstances. These are: Cave, Land, and Lake.

Cave Habitations. These are, naturally, only common in limestone countries where suitable caves abound. Neolithic cultures have been brought to light from Austria, Czecho-Slovakia, Germany, Italy, Spain, France and England. The deposits containing the cultures are usually superficial and have not enabled prehistorians to zone the civilisation. Even when, as in the case of a cave in North Italy, a number of layers can be distinguished, their contents do not indicate any real change of culture from bottom to top. Further, deposits containing Neolithic cultures are not sealed in by layers of stalagmite as is often the case with Palaeolithic deposits. These stalagmite layers are of very great importance; not only do they seal in all below them and prevent destruction by water, etc., but, still more important, they act as a barrier to burrowing animals. Even Palaeolithic deposits, unprotected by stalagmite, are liable to disturbance by rabbits, badgers, etc., and in the case of superficial, unprotected Neolithic deposits this danger is more common.

In the Danube basin the Neolithic Cave deposits indicate a folk living largely by hunting, supplemented by agriculture and domestic animals. They seem to have survived until comparatively late times, for traces of metal appear in some of the deposits. There is, however, nothing extraordinary in this, for in limestone countries the use of suitable caves as habitations has been known in our own day.

Land Habitations. These often take the form of pits covered by a roof. Good examples are found in the so-called *Fonds de Cabanes* on the Plateau of Hesbaye, Belgium. As one walks over the ploughed field nothing is seen of the Neolithic habitations below, but, if a staff three or four feet long, with a sort of gimlet end, be driven into the ground and carefully withdrawn, at various places where habitations exist, the end of the stick will bring up traces of black earth and cinders. When excavated the *Fonds de Cabanes* prove to be more or less circular in shape. At the bottom are found

ashes, bones of animals, implements and pottery. Occasionally a workshop is discovered containing cores, flakes, and implements in all stages of manufacture. The habitations seem to have been covered in by a roof composed of boughs and twigs, the whole rendered waterproof by a coating of clay. Fragments of this clay which had fallen into the huts have been recovered, some still showing the impress of the twigs, etc. These *Fonds de Cabanes* are congregated together, forming villages. They occur too in England, as at Peterborough.

At Campigny (France), which has given its name to the earliest division of the Neolithic (Campignian), oval pit dwellings are found, many having a long diameter of five yards or so across.

Sometimes the habitation pits take the form of trenches with one or more side chambers.

Lake Habitations. Man's chief preoccupation in Neolithic times was still self-protection; more and more so as communal life increased the number of defenceless women and children congregated together—not to speak of personal and public property. The danger came not only from neighbouring people but also from wild animals, of which numbers still existed in Europe although most of the larger Quaternary mammalia had disappeared. For these reasons Neolithic Man (and after him Bronze Age Man) often sought a lake and built his home on piles, some distance from the shore, in the shallow water. Remains of these lake dwellings were first discovered in Switzerland by Dr Keller, President of the Antiquarian Association at Zurich, in the winter of 1853–4. Glacier-fed rivers and lakes show their greatest diminution in a hard winter when all the head waters are frozen. Some of the inhabitants of the village of Ober-Meilen, on the east shore of the Lake of Zurich, took advantage that year of the extremely low level of the lake to reclaim some of the shore for their vineyards. While digging operations were going on in order to raise the reclaimed land above the ordinary level of the lake, wooden piles, with portions of stag horns, stone hatchets, and other implements were discovered. Since that date the shores of the Swiss and North Italian lakes have been examined when, owing to summer drought or to winter frost, the water has been low, and a number of these lake

dwellings have been found. Most of them belong to the Bronze Age, but some are of Neolithic date. The folk threw their refuse, etc., into the water and the objects have been preserved for us in the peat.

Tombs.

Disposal of the dead is always an important matter. Burial was universally practised in Neolithic times, and we find no trace of cremation until well on in the Bronze Age. The bodies were often covered with a low tumulus of earth or stones; sometimes the burial took place in a cave, as in North Italy, when the body, together with funeral furniture, comprising beautifully made stone implements, etc., was surrounded by a ring of stones. It sometimes happens that objects forming the funeral furniture are all found broken, and it has been suggested that this may be connected with a belief in an after-life. As long as an axe remains unbroken the spirit of the axe remains in this world—break the axe, and its spirit is set free to follow and be of use to its owner.

Burial is almost always in a contracted position and the use of red ochre still persists. It would sometimes appear that the soft parts of the body had been allowed to decay before the final burial took place.

In late Neolithic times we find great Megalithic erections connected with the burial of the dead, and these continue into the Bronze Age. They are sometimes of the nature of large single upright monoliths, known as Menhirs, which are of almost universal occurrence. There is also the Dolmen, consisting of some 3 or 4 monoliths on which rests an immense slab of rock, often several tons in weight. How these primitive folk managed to lift these lids on to the pillars of the Dolmen is a complete mystery. Dolmens are found in South Sweden, Denmark, Slesvig, North Germany, Belgium (rare), France, Spain (down to the extreme south), Portugal, Switzerland (two), Heel of Italy (rare), Bulgaria, Crimea, Caucasus (?), Syria, Upper Nile, India, Pacific Isles (?), England (Devil's Den, near Marlborough; Chagford, in Devon, etc.), Scotland (rare and doubtful), Wales (frequent), Ireland (very common, 800 at least).

Another kind of Megalithic tomb is the so-called passage

chamber grave, or *allée couverte*[1]. This consists of a chamber of large flat upright flags, on which are laid cross flags for the roof. Sometimes when the chamber is large the roof is vaulted, or corbelled. Access to the chamber is gained by a long passage, made also of upright flags with a flagged roof. Sometimes, not always, the whole is covered by a large cairn of earth, and in some cases one cairn contains more than one *allée couverte*. Some of the stones in the *allées couvertes* have geometric engravings and they have a wide distribution occurring in Scandinavia, Britain, Ireland, France, Spain, etc.

The last type of Neolithic-Megalithic tomb is the stone "cist." Some think it is a development of the *allée couverte*, where the chamber ceases to exist, the passage is shorter, and the end of the passage is used instead of a chamber. These are the latest Neolithic Megalithic buildings known.

The time during which Neolithic Man in Europe did not know about metal seems to be very short indeed. The general use of it depended entirely on whether suitable ores occurred in the district. A restricted commerce doubtless always existed, but it would not seem to have been sufficient to supply metal tools to districts lacking in ores. Scandinavia may be given as an example of this, where metal daggers from districts further south were laboriously copied in stone by the late Neolithic folk.

It is impossible to draw any hard line between Neolithic Man and Man of the Bronze Age except in certain areas where the change came about by the invasion of a district by new tribes of different physical characteristics. On the other hand, the cultures are distinguished by the presence or absence of metal, and also by the shape of the tools.

As will be seen in a subsequent chapter an extensive art was practised, both in the decoration of pots and other household objects, on tombs, and in certain places on rock surfaces.

As has been said, the Neolithic civilisation comprises many more local differences than was the case in Palaeolithic times. It has been thought best, in the short space available, to give a few notes on the Neolithic of various regions beginning with *Scandinavia*.

[1] Often called "passage grave."

When the ice of the last glaciation retreated from Scandinavia the Baltic was left as a wide channel open at both ends. This was known as the Yoldia Sea, and Scandinavia was an island. The fauna includes a characteristic bi-valve shell (*Yoldia arctica*), indicating a water temperature never above 1° centigrade; and the flora includes *Dryas octopetala* and *Salix polaris*, indicating a summer temperature of from 5° to 6° centigrade. When the ice finally disappeared the land rose, access to the Baltic was shut from both north and south, and it became a lake. This is known as the Ancylus lake, named after a little shell, *Ancylus fluviatilis*, which lived in its waters. Next a southern flora, birch, aspen, and pine, displaced the arctic plants, and the first human civilisation appeared. Finally when the ice had quite disappeared, the southern half of Scandinavia sank again, and the Ancylus lake was transformed into the so-called Littorina Sea. The climate was rather warmer than it is to-day, there being quantities of oysters and *Littorina litorea* in the sea, and on land forests of oak, lime, elm, and hazel, in place of the previous pine and birch. At this period Neolithic Man arrived. Since that time the elevation of South Scandinavia has commenced and still slowly continues.

There is no country where the Neolithic age can be so well studied as in Scandinavia. In spite of all that is said to the contrary Palaeolithic Man probably never entered the country. During Middle and Upper Palaeolithic times it was uninhabitable, being under a sheet of ice. It was only when the ice retreated that Man could arrive and settle.

The first culture found is the so-called Maglemosean. The type station of Maglemose, that is "the great bog," is on the west coast of Zeeland, near the harbour of Mullerup. It was a fresh-water lake in Ancylus times, and the Maglemose folk lived on a big raft of pines anchored in shallow water some 350 metres from the shore. The lake has since silted up into a bog, and it is by digging that we come on the remains of this early people. It is thought that the Maglemose folk were a final development of the eastern Palaeolithic focus of civilisation, and that they were driven to the Baltic areas by the oncoming Neolithic peoples. This is a parallel to the arrival of the Azilio-Tardenoisean

civilisation in France. Finds of Maglemose age are meagre, and in isolated localities, and many more facts are needed before we can piece together the history of this interesting culture. Harpoons typical of this age have lately been found in East Yorkshire, underneath the peat.

These people were succeeded by the first Neolithic arrivals, and soon appears the "kitchen middens" culture. They lived along the sea coast and their kitchen debris, shells and the like, formed long ridges running parallel to the coast for some considerable height. Their implements were poorly made and chipped, but are typically early Neolithic[1]. They were followed by the next culture that employed polished stone axes: these are the ordinary tongue-shaped axes pointed at one end, and when cut across they show an oval section. No Megalithic tombs of this date have yet been observed. Next we find the polished stone axes getting bigger and the edges instead of being rounded are squared; their section is therefore an oval with truncated ends. Associated with these are the menhirs and dolmens. The succeeding age used large polished stone axes which had now completely lost their original oval section, being flattened top and bottom with squared edges; in section they are therefore a parallelogram. In the place of the dolmens we get the *allées couvertes* or passage graves. In the succeeding period we find the same type of polished axe used, but associated with a new form rather like a Canadian canoe with a hole in the middle for hafting, both ends having working edges[2]. It is in this period also that we get some marvellous copies in stone of metal daggers; and the Megalithic tombs indicate the degeneration of the *allées couvertes* to the stone "cist." Hard on this time comes the true Bronze Age, which as we shall see later can be divided according to the various types of implements found. To these days belong certain rock engravings.

Britain. Neolithic tools (cores, scrapers, etc.) are common in certain areas (the Downs, etc.). Surface finds are frequent in E. Anglia, but some are possibly of Bronze age[3]. They consist of little chipped arrow-heads, sometimes with one

[1] They include typical Campigny axes.
[2] One of this type is found at Oban, Scotland.
[3] See Plate VIII.

tang and sometimes without any. Two side wings are often present occurring with or without the tang. There are also lozenges, some oval, others more angular and others pointed at one end, the other being rounded. Large leaf-shaped lance-heads are found as well as a tool, flat on one side and convex on the other, known as a slug. Awls, notches and fabricators, little convex-edge chisels and barbed points all occur and the resultant industry is a very rich one. Scrapers, of course, abound, among them being small round scrapers possibly used for studding Tribula. There are also large chipped and polished chisels and chipped and polished axes, etc. Occasionally small blades with blunted backs are found.

The early Campignian industries also occur in Ireland, and certain peculiar tools are developed. One of these is a sort of broad double-shouldered point which seems only to be found on the N.E. coast of Ireland. The other is a stout barbed-point; this latter is sometimes found also in England.

In North Wales Mr H. Warren has discovered a Neolithic flint implement factory. Igneous rock was used, and blades were struck off from cores bigger even than those from the Grand Pressigny in France.

In East Anglia there is a very important Neolithic flint mine known as Grimes Graves; flint mines of this nature are found, for example at St Gertrude (South Holland), a British one at Cissbury, one at Spiennes in Belgium, and in France at Bas-Meudon (Seine) near Paris, at Petit Morin (Marne), at Nointel (Oise), and at Mur-de-Barrez (Aveyron).

It has been affirmed by some that these flint mines at Grimes Graves[1], were not Neolithic but Palaeolithic. M. Breuil, who studied them from this point of view in 1920, failed to see anything Palaeolithic in their industry. Various peculiar forms of tools do occur, however, and these he pointed out were probably part of a miner's tool-bag; these tools would be obviously different from household or hunting tools; special tools would be required for sharpening the

[1] Grimes Graves, report on excavation of, *Prehist. Soc. East Anglia*, March–May, 1914.

stag's horn picks that were used, also for removing the adhering chalk from the nodules of flint[1].

Megalithic tombs are found in Great Britain (long Barrows), especially in Ireland, though it is less easy to determine the chronological sequence than in Scandinavia.

France. The earliest manifestation of the Neolithic culture in France is the so-called Campignian stage, already described, where the Campigny axes are well represented[2]. A microlithic industry has already been noted in connection with the Azilian period as occurring in certain places in France and Belgium in association with pottery; this is no doubt in part Neolithic, though in part Azilian. In this connection the small industries from the coast of Bas-Médoc found by Dr Lalanne, consisting of small round scrapers, awls, and the like, may be recalled; whether or not these are Azilian or of true Neolithic age has not been determined, though the occasional presence of gravers will suggest the former. Following on the early civilisations comes the so-called Robenhausen stage with its polished stone axes; a good place for studying this is at Grand Pressigny (Indre-et-Loire), which place has a characteristic honey-coloured flint, a source of supply to Man in all ages for his tool-making. In Neolithic times there was a great commerce; on the heaps of stone for road mending beside the roads at Grand Pressigny are found to-day great cores of flint called *livres de beurre*, from which Neolithic Man struck off flakes, sometimes 18 inches long, that were traded far and wide.

The last period in France is represented by the Megalithic monuments, dolmens, *allées couvertes*, and the like, including the vast remains of Carnac; and following on this came the Bronze Age divisible into various stages.

Switzerland. In Switzerland in these times Man greatly preferred to live in dwellings built out on piles from the

[1] Some pieces of flint-crust, engraved with figures of stags have been found. The technique is questionably Palaeolithic; perhaps comparison may be allowed with Böla, Wauwil, and a celt engraved with a fish in the Museum at Carnac. It has been suggested lately that the earliest industries, including these engravings, may be of Maglemose age. See p. 155.

[2] A very rough prototype of the Campigny axe has lately been recognised among the Mousterian tools from Le Moustier itself.

shores of shallow lakes[1]; Vouga has distinguished a sequence of four ages of lake-dwellings, of Neolithic times, in Switzerland. The latest of these is of Bronze age, the others, Upper, Middle and Lower Neolithic. On the shores of these lakes agriculture and herding was practised, access to the dwellings being gained by boats or perhaps sometimes by a causeway built on piles. The result was a home immune from all attack except by boat. Refuse was easily got rid of into the lake. The industries consist of arrow points, fine scrapers, needles, occasionally harpoons (though of a very different type from any of the Palaeolithic), pottery, sometimes ornamented with incised lines, polished daggers, perforated teeth, "celts," etc. Occasionally even the remains of woven material is found. The only textile plant known was flax, it being a variety with a straight leaf indigenous to the basin of the Mediterranean; neither wool nor hemp was yet used. The cereals in Switzerland at this period include: wheat (*Triticum vulgare antiquorum, dicoccum*), possibly cultivated from the species that grew wild in the Nile valley; bearded wheat (*Triticum monococcum*), and six and two row barley (*Hordeum hexastichon, distichum*). Of domestic animals we find the remains of dog, horse, sheep, pig, and ox. The dog must have been the first animal domesticated by Man as herding would be impossible without a dog's help.

Spain. In Spain, as has been shown by the diggings of Louis Siret in the south of that country, we start with a series of pigmy industries which may be the end of the Capsian period, that is to say equivalent to Azilio-Tardenoisean times. No doubt these were more largely a hunting and fishing people than agricultural and stock rearing population. The earliest Neolithic Spanish layers yield an *art mobilier* comprising in its simplest form a conventionalised human figure made on a phalange-bone, little more than two eyes, a nose, and a mouth being necessary. In Portugal the phalange-bone is carved into the angular shape of a human figure, or a bone cut into the form of an elongated cone with a bulb on the top is used instead. Next came the time of the polished stone-axe culture, with copious well-

[1] Houses may have been built on piles long before lake-dwellings on piles had been thought of.

made pottery. In the second series of Neolithic implements in South Spain metal moulds for making tools have been discovered, but no actual metal tools. This was in turn followed by a late Neolithic or very early Bronze or Copper Age industry of beautifully polished stone implements, passage graves, and pots engraved in a similar style to that which we find painted on the walls of rock shelters. According to Siret these changes were not due to an evolution *in situ*, but to an immigration; the older civilisations continuing to develop on their own side, though no doubt absorbing a certain amount of culture from the newcomers. We therefore get a certain degree of over-lapping.

Mediterranean basin. Around the shores of the Mediterranean we have already noted that the Neolithic followed closely on the Upper Capsian or Azilio-Tardenoisean civilisations. At the eastern end of the Mediterranean the period when Neolithic Man knew nothing about metal was of very short duration indeed. Whether or not its use was discovered by the first Egyptians in the Sinai peninsula (as has been suggested), or whether this knowledge came from further east, it is found in the very earliest times in the Nile valley. Bronze was already known to the Egyptians of the fourth dynasty, and copper may even have been known a thousand years earlier in the fourth millennium B.C., or at a still earlier date at Susa in South Persia, where a town and necropolis of some thousand tombs were excavated by a French delegation under J. de Morgan. On this site primitive axes have been obtained from the base of 24 metres of archaeological layers. Bronze was also known in Crete before 2000 B.C., for at Hagios Onouphrios, near Phaestos, a bronze dagger of early Minoan age and a spear-head have been found with scarabs similar to those of the sixth to the eleventh dynasties in Egypt.

Pottery of pre-dynastic times (true Neolithic age) in Egypt is of very considerable importance, as it is often painted with conventionalised animals and spirals. The occurrence of spirals is particularly interesting, as this form of decoration seems only to have been developed in the Mediterranean area during restricted periods in time, viz. in the lower Magdalenian (Arudy, etc. in the Pyrenees), and in pre-dynastic and twelfth dynasty times of Egypt.

Eastern Europe. There is an important station at Butmir,

near Sarajevo in Bosnia, which has yielded pottery, often decorated with spirals or with a thumb-nail pattern, and earthenware statuettes. There are chipped and polished "celts," scrapers, and arrow-heads, but there is no trace of metal. This may well be of the same age as part of the predynastic period in Egypt. Further east another culture has been discovered, which seems to have moved southward from South Russia.

The Bronze Age.

Bronze Age cultures fall roughly into two main divisions in Europe: (1) those found north of the mountain backbone of the continent, and (2) those found to the south. The Bronze Age of northern and western Europe can be divided into four periods by studying the evolution of the principal tools (see table). In the first period bronze occurs but copper is very often used. In the other three periods the alloy becomes common and the tools and objects attain an astonishing degree of excellence. The Bronze Age culture of the south is classified by means of its pottery, but various regions must be distinguished; thus the culture is not quite the same if we compare Crete with the mainland of Greece or with the western fringe of Asia Minor. Crete is a very good place for studying the Aegean Bronze Age cultures owing to the explorations of Sir Arthur Evans and others. A sequence of nine layers of culture has been demonstrated. These have been called "Minoan" by Sir Arthur Evans.

A somewhat similar state of affairs exists on the mainland of Greece and a table attempting to correlate the two sequences of culture is appended.

In Egypt from the end of Neolithic times there was an extraordinary development of culture (owing perhaps to the Nile which permits easy means of transport). There were 33 dynasties of kings, the important ones being the sixth to the twelfth, the eighteenth, nineteenth and twenty-sixth. From the fourth to the sixth dynasties we have what is known as the Old Kingdom, which constructed the pyramids; the twelfth dynasty corresponds to the Middle Kingdom, when literature especially flourished. In the thirteenth dynasty Egypt was under the shepherd kings; and in the eighteenth dynasty we have the Egyptian empire in Asia.

Crete		Greek Mainland		Corresponding Egyptian Dynasties (Determined by finding dateable Egyptian objects in Cretan deposit of known age; and *vice versa*.
	3		3	XIX = 1300 B.C.
Late Minoan	2	Late Helladic	2	
	1	(= Mycenaean)	1	XVII = 1600 B.C.
	3		2	
Middle Minoan	2	Middle Helladic	1	
	1			XI = 2200 B.C.
	3			
Early Minoan	2	Early Helladic		
	1			VI = 3000 B.C.
Neolithic		Neolithic		

The development of the principal Bronze tools is as follows:

Axes. 1. Flat celts. 2. Flanged. Slight flanged, straight edged to considerable edge-flanged. 3. Stop ridge. 4. Palstave. 5. Winged type. Wings first appear in the middle of the tool and then at the end. (This is a foreign type.) 6. Socket[1] celts.

Knife dagger. 1. Broad type (very early). 2. Narrow type. 3. Leaf-shaped type. 4. Dagger axe (halberd). Sometimes early however.

The spear and the sword are derived from the dagger.

Spear. First derivative of dagger axe, earliest is *Amorgos* type. British Museum Bronze Age Guide, 1904, p. 121.

Sword. Second derivative of the dagger axe, the earliest types are found in Spain and Portugal.

A. Derived from tanged Cypriot type.
1. With long tang, sometimes curved at end. 2. With short tang and rounded or triangular base. 3. Without tang, but Languette.

B. Derived from a triangular dagger.
1. With round base. 2. With trapeze base.

C. Derived from various models.
1. Broad flat flanged tang with rivets sometimes slotted. 2. With bronze handle without antennae. 3. With bronze handle with antennae.

A. Rapier (lengthened dagger).

B. 1. Without notch, leaf-shaped sword (derived from lengthened dagger).
2. Notched leaf-shaped sword (derived from lengthened dagger).

Note: B 1 and 2 are to be correlated with C 1.

No antennae and probably no bronze handles are indigenous in this country.

The discovery and use of iron followed that of Bronze. Soon after this we can start to piece together the history of mankind from written records.

[1] Sir William Ridgeway has suggested that in England the socket celt was derived not from the winged type, but from an over-developed stop ridge form.

CHAPTER XIV

PREHISTORIC MAN

THE anatomical study of the skeletons of prehistoric Man is better treated of under the heading of Physical Anthropology; and so here the reader will only find a short general epitome of the various prehistoric races, without much special reference to the physical differences in their anatomy.

Human skeletons of Palaeolithic date, which are in a condition useful for study, are found but rarely Although in many cases we seem to have evidence of a definite burial, in others the dead man seems to have been simply thrown out. Weathering would then rapidly destroy what the wild beasts left. It is only now and then, where the remains are covered by some rapidly growing deposit, that they have lasted to our own day; and of course it is mere chance that we happen to come upon them. Again, unless the human bones happen to be in a cave which is being excavated by scientific observers, it is usually workmen who discover the bones. There is no harm in this if the various gravel and loam pits are being continually visited by some local archaeologist who knows the workmen; under these circumstances the data obtained will be exact, and a good local archaeologist will find himself on the spot soon after the discovery is made, while the details and the exact horizon are still in the workmen's minds. On the other hand, there are only too many cases where the bones have reached some local collection with nothing but their provenance (if indeed so much as that) indicated; there being no details as to their exact horizon, or what deposits covered them. It may be only years afterwards that an anatomical study demonstrates the importance of the find; and then of course it is too late, for little reliance can be placed on workmen's evidence unless obtained while the memory of the discovery is still fresh in the mind.

It is desirable that all the gravel pits and commercial diggings in our country should be under the eye of some

local archaeologist, who could then bring forward at once any find of scientific value that occurs in his district. Naturally, all that we have said about finds of human remains applies with equal force to finds of stone implements, etc.

It will have been already observed that as far as Western Europe is concerned the various cultures of which we have treated do not all correspond to profound changes of race. In Upper Palaeolithic times, as we have seen, the Magdalenian and the Azilian cultures were probably only evolutions from the Aurignacian. Therefore we should not expect to find that deposits of these ages contain skeletons of a profoundly different type. Again, it has been suggested that the Solutreans were only the Aurignacians modified by contact with a Lower or Middle Palaeolithic folk still surviving in districts where the Aurignacian people never penetrated. As a matter of fact all these Upper Palaeolithic cultures can probably be referred to one race, which underwent slight modifications in various areas. The only exception seems to be the occurrence at Mentone, along with the usual type, of a new race with negroid characteristics, of which we shall have to say more hereafter.

The earlier Palaeolithic periods seem to have had much more uniform civilisations. Possibly this was due to the higher civilisation of Upper Palaeolithic times, this high civilisation leading to rapid modifications not only in the industries, but possibly in the human frame also. It should be borne in mind, that though these earlier races did not seem liable to much modification, there was by no means then only one human race in Western Europe; on the contrary, we have distinct evidence of at least two in Lower Palaeolithic times, and there may have been more.

It is most likely that Mousterian Man was not a simple development of the Acheulean, at any rate not in France. This has already been discussed, the suggestion being, that the climate and physical conditions of Germany evolved the Mousterian type from the earlier more universal Chellean; and that this took place during the Acheulean times of France. In this case the coming of the Mousterian culture to France would be of the nature of immigration and

infiltration among the Acheulean folk. Acheulean industries seem to be very rare in Germany.

We might therefore expect to find already in Chellean times, especially towards the end, two different types. The one a Proto-Mousterian, in Germany, and the other Acheulean, in France. Hardly sufficient human remains of this date have yet been found definitely to demonstrate this theory. We shall discuss our main subject under the following heads:

Tertiary
Pre-Palaeolithic
Lower Palaeolithic
Mousterian
Upper Palaeolithic
Neolithic
} human remains.

Tertiary Man.

The theories of biologists have required, and the Eolithic implements in East Anglia have lately demonstrated, the almost certain existence of pre-glacial Man.

How human this Man was, and how intelligent, is naturally a matter of speculation. The biologist is as yet uncertain whether specialism of the brain was the result of the erect position, or vice versa. We should hardly expect that many human bones from this remote period would have survived to our day; but the remains of a very interesting being from the Tertiary deposits of Java have been discovered by Dr Eugène Dubois, who had left Holland for Java with the express intention of there finding the missing link.

A molar tooth (M. 3, right side) was found in September, 1891, and a few months later a skull-cap, some 3 or 4 feet away. In the middle of the next year the thigh bone of the left leg was unearthed, about 50 feet from where the tooth had previously been found. Finally, in the autumn of that year, in the month of October, a second molar tooth (M. 2, left side) was found lying ten feet away. Dr W. Booth Pearsall considers it also a wisdom tooth (M. 3). In a letter to Professor Sollas, which is published in the latter's book, *Ancient Hunters*, he notes that the cusps of this tooth

have been worn away by attrition, and that the wisdom teeth of baboons and other apes are similarly worn down.

These finds have been referred to a being called *Pithecanthropus erectus*. Nothing but an additional grinding tooth (p.m.) has been discovered by further investigators.

The actual locality where this early relic was found is in a gently undulating series of fresh-water and volcanic deposits, considerably over a thousand feet thick, lying on the southern flank of a low range of hills, called the Kendengs, at the extreme east of Java. These beds, which consist of consolidated clay, sand and lapilli, rest on a marine bed, seven feet thick, of coral limestone, which in turn rests on a bed of clay, the marine shells of which indicate volcanic conditions, as they are preserved with their valves closed. The river Bengawan has cut into these fresh-water deposits to a depth of some 50 feet, there being a very fine section at the village of Trinil. The lapilli bed has yielded a rich mammalian fauna, composed of various kinds of deer, including one somewhat similar to the sambar, still living in India; and one resembling the kidang, still living in Java. There is also a new species, *Cervus lyrioceris*.

An antelope, *Tetraceros kroesenii*, similar to a modern Indian variety, is found as well, with two species of buffalo, two species of rhinoceros, two species of pig, a tapir (similar to one living in Sumatra to-day), a hippopotamus, the extinct stegodon, birds, reptiles (both similar to existing species) and a shark (showing the proximity of the sea).

There were monkeys, such as *Semnopithecus* and *Macacus*, as well as a large pangolin, some 8 feet long; and Carnivora, amongst which was *Felis groeneveldtii* (a sort of cross between a lion and a tiger).

These beds have been identified as Upper Pliocene[1], though H. Pohlig has compared them with our Cromer forest bed. Not enough of the skull-cap remained for very precise measurement. Fortunately an interior cast could be made, which indicated that Broca's speech area, though almost twice as big as that in the anthropoid apes, was only half as large as it is in Man. Again, though here the imperfect nature of the remains makes precision impossible, the volume of the cranial cavity has been determined at 850

[1] Some consider them to be early Pleistocene.

cubic centimetres; while that of the higher apes is never known to exceed 600 c.c.; and that of Man never to fall below 880 c.c. The femur is distinctly human, and indicates an animal that walked erect. Although it was found some fifty yards away from the skull, we can hardly postulate more than one individual, in view of the extraordinary rarity of both human and simian remains. The length of the femur, 455 millimetres, would indicate that the height of this being was that of an average Englishman. The teeth are large and coarse[1].

No Tertiary Man has yet been discovered in connection with the very definite industries of Pliocene age in East Anglia; nor in connection with the more "doubtful" eoliths from abroad.

Pre-Palaeolithic Man.

Up to the present we have fragments of two human bodies probably of this period, a period which lies between the Tertiary on the one hand, and the true Palaeolithic on the other; which latter, as we have seen, seems strictly speaking to correspond with the last inter-glacial period. These two finds are:

The Heidelberg jaw, from the Mauer sands.
The human remains from Piltdown, Sussex[2].

Heidelberg jaw. Mauer lies 10 kilometres south-east of Heidelberg, and there, in 1909, a Dr Schœtensack found a well-preserved jaw of a primitive Man, which he named *Homo heidelbergensis*.

It was found some eighty feet from the surface, in a pit in the Mauer sands of fluviatile origin. The succession is:

Younger loess	5·74 metres
Older loess	5·18 ,,
Mauer sands	15·62 ,,

These fluviatile Mauer sands may correspond to one of the two upper fluvial terraces of the Amiens district.

[1] For these details of *Pithecanthropus erectus* the writer is indebted to Professor Sollas' book, *Ancient Hunters*.

[2] It is possible that the Piltdown deposit is of Tertiary age, and the human remains those of Tertiary Man.

The fauna includes: *Elephas antiquus* (the warm elephant); *Rhinoceros etruscus* (also found in the Upper Pliocene deposits of the Val d'Arno, Italy; in the Cromer forest bed; and the Siwalik hills, India); two species of bear (*Ursus arvernensis*, *Ursus Deningeri*); *Felis leo spelaea* (the existing African lion which survived up to historic times in Southern Europe); *Canis neschersensis* (similar to certain types of wolf); *Sus scrofa* (pig); *Cervus latifrons*; *Cervus elaphus* (variety *capreolus*); bison (*Bos priscus*); beaver (*Castor fiber*); horses' teeth (possibly belonging to specimens intermediary in type between the Pliocene, *Equus stenonis*, and the Palaeolithic and existing species, *Equus caballus*).

The climate must have been warm, and the period may have been the Günz-Mindel or Mindel-Riss (the first and second inter-glacial periods of the fourfold glaciation system of Penck).

If we follow the three glaciation system of M. Boule, and bracket the Günz and Mindel together (denying the existence of any important inter-glacial period between them), we should assign these Mauer sands definitely to the warm period preceding the Rissian glaciation.

The jaw itself shows no trace of a chin, and at first sight looks like that of some large variety of baboon, but all the teeth are essentially human, though somewhat primitive. Most of the characters recall a primitive and more powerful Neanderthal jaw, and if a cast of this jaw be put under a cast of the skull from Chapelle-aux-Saints, of Mousterian date, they are seen to fit together in a really extraordinary manner.

From the fact that the bony branches of the jaw close in on the space left for the tongue it has been suggested that the free use of the tongue in articulate speech was impossible.

Piltdown. Piltdown, Sussex, lies between two branches of the river Ouse, some 35 miles south by south-west of the Chellean stations on the Thames gravels. To the east is the Kent plateau.

The Piltdown gravels, which are heavily iron-stained, lie about 80 feet above the level of the main stream of the Ouse on a large well-defined plateau. Kennard has correlated them with the gravels of the high terrace of the lower valley

of the Thames, the height of which is the same. If this is really so the Piltdown gravel and its human fossils would have to be thought of as Chellean rather than of pre-Chellean age. Clement Reid held that the plateau was composed of Wealden chalk, through which flowed the stream bearing the Piltdown gravels, and that it belonged to a period later than that of the maximum depression of Great Britain; also that the deposits are of pre-glacial or early Pleistocene age after the cold period of the first glaciation had passed, and that they therefore belong to the very base of the implement bearing deposits in the south-east of England.

Dawson, the discoverer of the skull, suggested that the age of the human remains was to be referred to some warm period at the beginning of the Pleistocene age. There were very few objects that could really be called implements to help in dating the find. Those found seemed to be of a Chellean or pre-Chellean nature. On the other hand, a portion of an elephant's femur, worked to the form of a pointed implement, was found in these gravels. This was a unique find from deposits of such an early age[1].

According to M. Boule's succession of ice ages, the Piltdown skull, like the Heidelberg jaw, would be referred to the warm period preceding the Riss glaciation, and would therefore correspond to pre-Chellean times.

The skull does not appear to have been much rolled, and it is therefore certainly much more recent than the rolled fragments of Mastodon, and other Tertiary fossils, which are also found in the gravels.

Is it possible that Piltdown and Heidelberg are of the same age, though of different type, Heidelberg corresponding to the evolution in Germany towards the Mousterian Man, while Piltdown follows the French development? (Chellean to Acheulean?)

The succession of the deposits at Piltdown is:

1. Surface soil with flints. Thickness, 1 foot.

2. Pale yellow sandy loam, with gravel and flints. One Palaeolithic worked flint was found in the middle of this bed. Thickness, 2 feet 6 inches.

3. Dark-brown gravel with flints, Pliocene rolled fossils,

[1] This has been described elsewhere, page 89 note.

our skull, two beaver teeth, some "eoliths," and one worked flint. Thickness, 18 inches.

4. Pale-yellow clay and sand. Thickness, 8 inches.

5. Undisturbed strata of Wealden age[1].

For information on this subject the writer is indebted to the various papers published by Charles Dawson and Arthur Smith Woodward in the *Quarterly Journal of the Geological Society*.

Another similar skull has since been discovered in the Piltdown gravels, the second specimen coming from the surface of a field some two miles from the first site. The remains of the second skull found are so fragmentary as to be of little use, except for the fact that it has an additional bone not found in the other, and that the fragments by their similarity to the first skull, seem to warrant us in concluding that we are concerned with two similar individuals and therefore probably with a definite type of human being, and not merely a chance specimen or sport.

The first skull discovered was much more complete. The remains were first found by a workman, when digging a shallow pit for gravel, some few feet deep. The late Dr Dawson of Lewes drew Dr Smith Woodward's attention to the remains; the first publication of the discovery was in the *Quarterly Journal of the Geological Society*, March, 1913. The specimen was called *Eoanthropus dawsonii*.

No bones other than the skull were found, which is peculiar, as the condyles at the head of the femur would surely be equally resistant. It has even been suggested to the writer that the head might have been decapitated, as was the case with some remains of much later Azilian date found at Ofnet. The jaw lacks a chin, and is very simian, in fact Miller, Gregory and Boule regard it as the jaw of a chimpanzee. Matthew leaves it an open question, but most English anatomists admit that the jaw belongs to the skull. The canines are large and worn, but the other teeth are human in character.

The skull has been reconstructed by different people in various ways; but one outstanding fact is clear, that unlike later Mousterian Man, this early being had a high forehead.

[1] The actual Piltdown gravel is not, in character, unlike the detritus bed at the base of the Red Crag of East Anglia.

The fact that the young gorilla has a high forehead, which only becomes low and receding in the adult, would suggest that early Man and his precursors had also high foreheads, and from this point of view it is most interesting to find a skull with a high forehead, of earlier age than the Neanderthal type of Mousterian age with its low receding forehead.

Internal skull casts were made by Dr Elliot Smith. These showed that *Eoanthropus* had a low type of brain. Naturally, we can only judge from the general form, as we can never know anything of the quality of the brain material.

Lower Palaeolithic Man.

If Piltdown is truly Pre-Chellean, we can point to no well authenticated skeletons of definitely Lower Palaeolithic age; unless indeed the station of Taubach be truly Chellean. This latter fact has been denied, and the finds there have been referred to an early Proto-Mousterian culture. The finds of human remains at La Denise, near Puy (Loire), have been referred by some to a Lower Palaeolithic date.

Mousterian or Neanderthal Man.

In his memoir on "L'Homme Fossile de La Chapelle-aux-Saints," in the *Annales de Paléontologie*, 1911, Marcellin Boule has discussed which of the skulls reputed to be of Mousterian age can be really accepted for scientific study. His conclusions are, that we may include in our study the remains from the following places, which are here arranged according to the date of their discovery.

1856. (1) Neanderthal, the famous skull-cap (though not associated directly with middle Pleistocene bones, mammoth was found in a similar position in a little cave hard by).

1859. (2) At the Grotte des Fées, near Arcy-sur-Cure (Yonne). A fragment of a human jaw, very mutilated, showing a mere indication of a chin.

1864. (3) At Forbes Quarry, Gibraltar. A human skull described by Busk, Sollas, Sera and Keith. It is of importance, though many details as to its discovery are obscure.

1866. (4) At La Naulette. A well-dated jaw.

The skull found at Bury St Edmunds in 1881 is so fragmentary as to be indeterminate.

1886. (5) At Spy, province of Namur, Belgium. Remains of two fairly well preserved skeletons. Found by MM. Marcel de Puydt and Max Lohest.

The deposits at Spy also contained *Elephas primigenius*, *Rhinoceros tichorhinus*, *Ursus spelaeus*, *Hyaena spelaea*, *Cervus tarandus* (rare); also implements of late Mousterian date.

1889. (6) In 1889 Hamy described a fragment of a jaw, and a portion of a face, from the cave of Gourdan in the Pyrenees; and M. Filhol described a lower jaw from the cave of Malarnaud, near Montseron (Ariège), which was found in a loam, with cave bear and mammoth.

1892. (7) The deposits found at Taubach, near the borders of the Thuringian Forest, may be Mousterian, or may be of an earlier date. The actual human material here consists of two human teeth of the molar series.

One is the first lower milk molar of the left side, and is much larger than any modern human specimen; the surface is also more worn.

The second tooth is the first permanent molar of the left side, and bears five cusps. It is distinctly narrow from side to side, to an almost simian degree. On the other hand, unlike the teeth of the apes, there is a slight tendency to concrescence of the roots, which are more or less parallel in direction when viewed from side to side.

The Taubach bone bed contains a warm fauna (without hippopotamus, as is natural in this hilly district), but the contained implements are of a very Late Acheulean or Early Mousterian type. Dr Obermaier has identified them with the industry of Levallois.

It may well be that we are dealing with a Proto-Mousterian culture made by Neanderthal Man, which was being evolved in Germany, at the time when Acheulean or even Chellean Man was still roaming over France.

1899. (8) Krapina, Croatia. Here were found ten or twelve heads, 144 isolated teeth, and numerous other bones, some of which had been burnt in the hearths. They were discovered by M. Gorjanovič-Kramberger. The roots of the teeth are fused together.

The fauna is warm, though the implements are Mousterian. It may therefore be compared with the Grotte du Prince, at Mentone, and also with Taubach.

1908. La Chapelle-aux-Saints. In 1908 the skeleton from La Chapelle-aux-Saints was first brought before the notice of the Academy of Science. This is by far the most important find of Neanderthal Man. La Chapelle-aux-Saints is the principal town of a commune in the department of Corrèze. It is reached from the railway station of Vayrac (on the line from St Denis-près-Martel to Aurillac).

Having passed up the little Sourdoire valley, 4 kilometres from Vayrac and 1500 yards from La Chapelle-aux-Saints, some dolomite limestone rocks of Lias age are reached, and in a small cave here the fossilised human skeleton was discovered by MM. Bouyssonie and Bardon.

We have here to deal with a definite burial, the grave lying east and west, and the head of the skeleton being to the east. The grave, or trench in which the body was laid, was only covered by a single fossiliferous deposit. The body, which was nearly complete, judging from the position of the smaller bones to-day, had still the flesh on it.

The covering deposit was only some 30 or 40 centimetres thick, and the implements found were clearly of Mousterian type, there being typical side-scrapers, etc. This layer was sealed in by a thin sterile deposit of clay.

The fauna contains amongst others *Rhinoceros tichorhinus*, *Equus caballus*, *Sus scrofa*, *Rangifer tarandus*, *Capra ibex* (much less common), *Bos priscus*, *Bos primigenius* (?), some bones of wolf and *Hyaena spelaea*, etc.

The skeleton has a low receding forehead with thick brow ridges; the capacity of the brain case is however remarkably high, being 1600 cubic centimetres. An internal cast indicates a brain of a quite low status. The thigh bones are massive and rather curved, and the height has been estimated at about 5 feet 4 inches. The jaw is heavy, probably prognathous, and without a chin.

1909. In 1909–10 two skeletons were unearthed from the rock shelter of La Ferrassie, by MM. Capitan and Peyrony, up a side valley of the river Vézère, some two miles from the little town of Le Bugue, not far from Les Eyzies.

At about the same time these explorers found the skull of an infant in a Mousterian deposit of the little grotto of Pech de l'Azé, near Salat (Dordogne). At La Ferrassie we do not seem to be dealing with a burial, for the body seems simply to have been left in the rock shelter, lying in a crunched-up position on its side, and to have been covered by the ordinary kitchen debris. It would thus have still been possible to inhabit the rock-shelter, owing to the intense cold of Mousterian times, which would have prevented the too rapid putrefaction of the flesh. Some skeletons of infants found at La Ferrassie had been buried, however, in trenches.

The section of the big rock shelter at La Ferrassie, where the skeletons were found, is:

1·20 Humus and Talus.
1·00 Upper Aurignacian (with gravette points) and sterile.
·50 Middle Aurignacian.
·20 Lower Aurignacian (with Châtelperron points), Upper Mousterian.
·50 Pavement (largely arranged as such by Man), Lower Mousterian (with the two skeletons).
·50 Acheulean.
·30–·40 Sterile sand.

1910–11. In 1910–11 human teeth were discovered by Dr Marett in the Mousterian deposits of the cave of St Brelade Bay, Jersey.

The fusion of the roots of these teeth reminds one of the Krapina specimens.

1911. Finally in 1911, at La Quina (Charente), in a deposit of clearly Upper Mousterian age, judged by the contained industries, a skeleton was found by Dr Henri Martin, similar in type to that of La Chapelle-aux-Saints.

There are of course other finds, those for example at Galley Hill in England, Moustier (Dordogne), and a fragment of a jaw from Šipka (Moravia). These have not been mentioned in the list, as the remains are either too fragmentary or too distorted subsequently to be of scientific value, or details as to their discovery, and the associated human industries, are not sufficiently authenticated.

Upper Palaeolithic Man or the Neoanthropic[1] Race.

As has been already pointed out there are several modifications of human types occurring in the various periods of the Upper Palaeolithic era.

The earliest discovery of a skeleton of this era was made by Buckland in the cave of Paviland, South Wales.

1823. Somewhere about 1823, a skeleton was found in the Cave of Paviland. It is that of a man, though it is still sometimes erroneously called the "Red Lady of Paviland." The skeleton had been covered with red ochre when buried.

1852. In 1852 the Cave of Aurignac (type station of the Aurignacian) was accidentally discovered by a workman. It seems to have been used as a burial place, and contained something like twenty human skeletons, and some animal remains. These were however reinterred in the village cemetery and are lost.

1868. In 1868 the little rock shelter of Cro-Magnon, on the Vézère, near Les Eyzies, was found by Lartet. In it were five skeletons, those of an old man, a woman, whose forehead carried the marks of a heavy blow, a child, and two young men. The implements clearly belong to the lower half of the Aurignacian times, and there were also some perforated sea-shells, brought therefore from afar. We are obviously dealing with a burial.

There are many other examples from Aurignacian deposits of the true Cro-Magnon type.

This Cro-Magnon type of skeleton has been described

[1] *Vide* p. 106.

by Broca, and later by Verneau. The former notes the high stature, the dolichocephalic skull, with a large brain capacity, in conjunction with a broad face. The Cro-Magnon woman's brain capacity is even larger than that of the average man of to-day. The forehead is broad, vertical, and convex on the median line, while the bones of the limbs are robust, and the shin bones flattened transversely. M. Verneau in his monograph on the anthropology of the caves of Grimaldi, where specimens of the Cro-Magnon type of skeleton were also found, emphasises the dolichocephalic or long-headed form of the skull, in combination with a face very broad for its length[1], the cheek bones being both broad and high. This leaves a very small space between the eyes, and the nose is narrow and aquiline. The eye sockets are remarkably broad, shallow, with the angles but slightly rounded. As regards the jaws, the upper one projects forward, though the upper part of the face is almost vertical, as in true *Homo sapiens*.

The lower jaw is thick and powerful, with a massive prominent triangular chin. Muscle marks round the jaws indicate the great strength of the attachment muscles.

Several other interesting skeletons are known, such as that at Combe-Capelle (where there were signs of a definite burial, the limbs being flexed), Solutré (various skeletons), Ojcow (a skull-cap).

Two skeletons from Lower Aurignacian levels of the Grotte des Enfants at Mentone, which have been described by M. Verneau, are of a very different type, and seem to suggest negroid characteristics in the skull and hips. As has been noted negroid traits are observable in the little statuettes of Aurignacian date from the Mentone caves, also in the Venus of Willendorf (Austria) of Upper Aurignacian age, and in the bas-relief of the Venus of Laussel, also of Upper Aurignacian age. It might at first sight seem that the negroid race, and not the Aurignacian, were the artists. Complete absence of skeletons of this type in the Pyrenees militates against this. All the same the Venus of Laussel would seem to indicate a certain distribution for these negroid people, or at any rate some contact between them and the Aurignacian race, who gave birth to Palaeolithic art.

[1] This is not the case in every modification of Neoanthropic Man.

Nothing further can be affirmed on this subject until other finds of this negroid type are discovered elsewhere.

The following lists comprise most of the authenticated skeletons from the Solutrean and Magdalenian deposits that have been found. Some Azilian skeletons will also be noted. As has been said they probably merely represent modifications of the main Aurignacian race together with a new round-headed race, and the reader is referred to books on physical anthropology for the anatomical differences. In Solutrean times however there seems to have been a second, rather different type, living alongside the Aurignacian; for there are certain early Solutrean skeletons of considerable anatomical interest found at Brünn in Moravia and at Brüx in Bohemia.

It has been claimed that these show Neanderthal features, combined with an Aurignacian type. This would back up the idea that the Solutreans may have been a hybrid of Aurignacian Man with the Lower Palaeolithic or Mousterian Man from further east as a study of the implements suggests. Schwalbe denies the presence of any Neanderthal characteristics, and if, as seems likely, Solutrean folk originally came from far east, a local hybrid in Hungary would be an inadequate explanation. The skulls are very dolichocephalic and without any very pronounced brow ridges. The forehead is rather modern in type and the face is short and narrow.

Not all of the Solutrean skeletons are of this Brünn type. In France many of undoubted Solutrean age are of a quite Aurignacian type. Are we to imagine that these latter belonged to the Aurignacian folk, on whom had been imposed the Solutrean culture, by the invasion of a small number of the Brünn type; the real Solutrean race, the cradle of whose development was somewhere about Hungary or further east?

The following table, taken from Dr Obermaier, gives a few occurrences of the two types of Solutrean skeletons:

Aurignacian type.

Lacave (Lot), France.
Montconfort (Haute Garonne), France.
Laugerie Haute (Dordogne), France (skeleton).
Roset (Tarn), France.
Badegoule (Dordogne), France (fragment of child's skull).
Neu-Essing (Klause), Bavaria (skeleton).

The "Klause" skeleton was found in the second rock shelter at Klause, near Neu-Essing (Bavaria), in 1913, by Dr Obermaier and others. It was buried in ochre, and the description has yet to be properly published. There are four caves at Klause, one above the other.

The upper cave: Mousterian, Solutrean, Magdalenian (Lower and Upper). The latter yielded a painted pebble.

The second cave: Mousterian, Solutrean, Magdalenian (with the Solutrean burial).

The third cave: Acheulean.

The fourth cave has been destroyed by being used as a cellar.

True Solutrean race (?).

Předmost (Moravia), Austria (14 skeletons and various other human remains).
Brünn (Moravia) (skeleton found in 1891).
Brüx (Bohemia) (skull-cap found in 1871, now in the Royal Museum at Vienna).
Ballahöhle (Miskolcz), Hungary.

As regards certain modifications of the Aurignacian race in Magdalenian times, it may merely be added that Testut in describing the Magdalenian Chancelade skull, likened it to the modern Eskimo and suggested that it was definitely a modification of the basal Aurignacian race.

Magdalenian.

La Madeleine (skeleton).
Laugerie Basse (skeleton).
Cap Blanc (skeleton).
Raymonden or Chancelade (skeleton).
Duruthy (skeleton).
Les Hoteaux (Ain) (skeleton).
Le Placard (nine big portions of the cranium).
Mas d'Azil (a skull).
Grotte des Hommes (Arcy-sur-Cure, Yonne) (three skulls).
Castillo (two portions of a skull).
Obercassel (two skeletons).
Cueva Balla (a child's skull).

The following list given by Dr Obermaier comprises

a number of human remains of various ages of less scientific importance:

(*a*) La Combe (Dordogne). Two teeth, one pierced (Aurignacian) (MacCurdy).
Blanchard (Dordogne). One tooth (Aurignacian) (Didon).
Gargas (Haute Garonne). Femur (Upper Aurignacian) (Cartailhac and Breuil).
(*b*) Lacave (Lot). Parietal (Solutrean) (A. Viré).
Pair-non-Pair (Gironde). Parietal (Solutrean) (Daleau).
Roset (Tarn). Base of skull (Solutrean).
(*c*) Lussac-le-Château (Vienne). Mandible (Magdalenian) (Breuil).
La Madeleine (Dordogne). Fragments of a jaw (Magdalenian) (Cartailhac).
Les Eyzies (Dordogne). Different fragments (Magdalenian) (Lartet, Cartailhac and Capitan).
La Mouthe (Dordogne). One tooth and a back-bone (Magdalenian) (E. Rivière).
Limeuil (Dordogne). Base of a skull (Magdalenian) (J. Bouyssonie).
Grotte des Fées (Gironde). Fragments of a jaw (Magdalenian) (Daleau).
Brassempouy (Landes). Two teeth (Magdalenian) (Breuil).
Sordes (Landes). Various fragments (Magdalenian) (Breuil).
Aurensan (Hautes Pyrénées). Various fragments (Magdalenian) (Hamy).
Espeluges (Hautes Pyrénées). Various fragments (Magdalenian) (Nelli).
Montconfort (Haute Garonne). Base of a skull (Magdalenian) (L. Darbas).
Gourdan (Haute Garonne). Base of a skull (Magdalenian) (Piette).
(*d*) La Balme (Savoie). Base of the roof of a skull and a femur (end of the Palaeolithic) (G. Blanc).

Azilian Man.

A very interesting place where Azilian remains are found is at Ofnet, in South Germany, which has been described by R. R. Schmidt. There are only skulls with one or two vertebrae of the neck, and these, as has been pointed out by Count Begouen, show the marks of flint tools, as though the heads had been decapitated. They occur in two nests hollowed out by Azilian Man in the floor of the cave, the floor being a layer left by Magdalenian Man. One nest contains 27 skulls and the other six. They all point westward. This westward orientation is very peculiar as the Ofnet cave

opens south-west, and the skulls therefore face the wall. Most Upper Palaeolithic burials face the entrance.

The reverse sometimes occurs, however, for the Aurignacian negroid skulls at Mentone face into the cave.

At Ofnet are youths, young and old women, and only four adult males.

The old women wear more decorations of stag's teeth and snail shells (*Helix nemoralis*) than the young, and the males none. All have been buried in ochre, and all but one or two of the women and one of the men have implements of flint.

The section at Ofnet after R. R. Schmidt is:

Recent to Bronze...	32 cm.
Neolithic	53 „
Azilian	5 „
Upper Magdalenian	18 „
Lower Solutrean	20 „
Aurignacian	20 „
Dolomite sand with fallen blocks at base	65 „

An interesting point is the blending of races indicated here by some of the skulls, eight in number, of women and young people, being broad-headed, resembling the Alpine type, others narrow-headed resembling the Mediterranean type, and others intermediate. The dolichocephalic skulls have a long face, and are therefore dissimilar from the true Cro-Magnon type. This mingling of types may indicate a real mingling of races; already the influence of the true Alpine Neolithic race or races is being felt. The dolichocephalic Azilians of Ofnet, although they have a very long face (harmonic), and not a broad face (disharmonic) like the Cro-Magnon, belong to another modification of the Aurignacian folk which developed in the Mediterranean area. On the other hand, Schliz has compared them with the Brünn dolichocephalic (harmonic) race, but the resemblance seems by no means exact. They have also been thought to be an early wave westward of the so-called Mediterranean race; but as the origin and cradle of the latter are unknown this idea is not particularly helpful, and does not discount an ultimate Aurignacian origin.

The Brachycephalic skulls at Ofnet seem to be an early wave of the so-called Alpine people, with Neolithic culture,

quite different from any of the previous Palaeolithic races in Europe. It was they who introduced agriculture, domestication of animals, and the manufacture of pottery. The Ofnet specimens are similar to those of the sixteen skeletons found in the valley of the Lesse, at the cave of Furfooz (Belgium)[1]. They also resemble the supposed Neolithic skull found at Grenelle near Paris in 1870. At the first of these sites the animal bones and reindeer-horn implements point to an Azilio-Tardenoisean age. This would be quite in harmony with Ofnet, and merely indicate an early westward extension of the Neolithic Alpine race.

The usual opinion is that Neolithic Man had already become diversified, before he reached Europe, into three main groups. The southern, called Mediterranean, is narrow-headed and rather darker than the other two; the middle, called Alpine, is round-headed with a sallow parchment skin; and the northern (which arrived in the west rather later in time), called Nordic, is blond, blue-eyed and tall.

Professor Ridgeway, on the other hand, in his address to the anthropological section of the British Association for the advancement of Science, held at Dublin in 1908, upheld the view that Neolithic Man came into Europe as a single race, which became diversified *in situ*, owing to different climatic conditions. Is it not more likely that a single Neolithic race invaded the west and merged into a common culture other older and dissimilar folk? At any rate when the climate became genial in the west, various races with a common culture, with pottery, agriculture, and domesticated animals, poured into France and the west by various routes; and before this superior civilisation the old hunting peoples were overwhelmed, and were partly exterminated and partly merged into the civilisation of the newcomer.

At the same time it should be remembered that the problem of the transition time between the old Palaeolithic culture and the Neolithic civilisation has never been completely cleared up. However much we bridge the gap there remains something catastrophic in the change. A quiet steady development from Magdalenian to Azilian and from Azilian to Neolithic does not seem probable. The addendum note to page 156 suggests a geological cause that was perhaps a factor in the case.

[1] The burials, however, appear to be more recent than the industries contained in the terrace.

On Palaeolithic Ceremonial Burials.

Undoubted burials are to be found from Mousterian times onwards. These are often accompanied by decorative objects and weapons, etc. Weapons become specially numerous in Upper Palaeolithic times. Ochre was often used in burials, and for colouring the corpses. The Combe-Capelle male skeleton not only had his limbs flexed, but was decorated with a shell necklace, and near him were a number of excellent flint implements. There were necklaces of sea-shells at the rock shelter of Cro-Magnon.

The burials at Mentone are however the most remarkable. One of the males had his arms crossed, though not his legs, and had a sort of head-dress of perforated shells, his head resting on a block of red stone. This was by no means an unique occurrence. The female was actually found enveloped in a covering of non-perforated shells, while the infants, who had neither colouration nor decoration, were buried with a quantity of perforated shells (Nassa), which had obviously been of the nature of a winding sheet.

The peculiar burial of Ofnet, of Azilian age, has already been described.

Perhaps the most interesting of these ceremonial burials —partly because of its early age, partly because of the novel details connected with it—has been unearthed at La Ferrassie a little while ago. The age is undoubtedly Mousterian, for the find occurs at the surface of a brown deposit containing a Mousterian industry and is completely covered by a black deposit equally clearly of Mousterian age. The burial (of a young person) was discovered under a large rock in a trench. The rock had been placed in position by man and its surface was covered with artificially made cup markings[1]. The head of the skeleton was on one side of the trench—the face bones being altogether removed—and the rest of the bones on the other side of the trench.

[1] Not to be mistaken for cup and ring markings.

CHAPTER XV

CAVE ART

Aurignacian and Magdalenian Man, besides manufacturing delicate bone and stone implements, practised an advanced art. This, in all probability, does not apply to Solutrean Man, who apparently had little artistic talent[1]. This art can be divided into two main groups.

1st. That which is found emblazoning the walls of natural caves.

2nd. That which is found drawn on bone and stone in the cave deposits, accompanied by dateable stone implements (*Art mobilier*).

The latter will be treated of separately in a subsequent chapter.

There are a certain number of caves, both in France and Spain, where we find representations of animals, sometimes engraved, sometimes painted, that are occasionally of such beauty and excellence that a modern artist would find them hard to equal. Such an one is the well-known cave at Altamira, where a ceiling in the cave is decorated with paintings, in polychrome, of bison and other animals, before which one stands amazed on thinking of the great gap of time which separates these early folk from us to-day. Several considerations presented by this art have to be considered.

1. The distribution of the art as far as is yet known.
2. The materials and methods used.
3. The sequence of style, giving the relative age of one group to another, and the correlation of the age of the various paintings with the archaeological succession which we have already traced, judged from the different excavations of Man's dwellings.
4. The animals figured.

[1] The one or two examples of art of Solutrean age may be merely a surviving culture from Aurignacian times.

5. The reason for the making of the drawings (this will be treated of in a subsequent chapter).

It may be well, however, to begin by discussing the authenticity of the cave art, and the proofs of its Palaeolithic age. The proofs may be grouped under five heads.

I

Drawings and sculptures are sometimes found buried under deposits containing dateable stone implements, and are therefore older than these deposits.

Four examples of this may be given.

A. **Cap Blanc.** This is a shallow rock shelter on the sunny side of the valley of the Beune, a tributary of the Vézère, and lies about five miles from Les Eyzies itself. The back wall of the cave had been decorated with a sculptured frieze of horses[1], bison and oxen, the last animals poorly executed. One bison had become detached, and is now in the collection of Dr Lalanne at Bordeaux. The whole was covered by a deposit of clayey earth and was only discovered when this was dug away. The earth had accumulated during Man's occupation, and in it were found specimens of Lower Magdalenian industry, as well as a skeleton of a Lower Magdalenian Man. Large stone implements, suitable for carving the frieze on the limestone wall, were also found in the deposit. This frieze must be older than the beds which cover it, and it was therefore probably made by the men living in the age of the bottom of the deposits (Lower Magdalenian). It may be that the man whose skeleton was found there was the actual artist.

B. **La Grèze.** Further down the Beune valley, on the same side, is the little grotto of La Grèze. The entrance is low, and opens on to a small ante-chamber. Behind is a corridor filled with clayey sand, which has not yet been entirely dug away. Formerly the ante-chamber was nearly blocked with deposits, and contained implements of Magdalenian and Solutrean age, graving tools, scrapers, laurel-leaves, and bones of reindeer, hyena, bison, and rhinoceros. When these had been removed, it was found that at the back of the ante-chamber near the soil was a primitive but

[1] See Plate XIX, A.

vigorous engraving of a bison[1]. This must be older than the deposits of Solutrean age which cover it, and, as we shall see from the style of art, was probably made by Aurignacian Man.

C. Pain-non-Pair[2]. Near Bourg-sur-Gironde is the Cave of Pair-non-Pair, which has been completely excavated by M. Daleau in person. It is a small grotto, and when M. Daleau started work was almost completely filled with deposits, entrance being gained by an upper chimney. As the deposits were removed an entrance lower down was brought to light. The cave contained bones of mammoth, rhinoceros, bear, lion, hyena, bison and reindeer, as well as implements characteristic of Aurignacian and Mousterian times. No implements of Magdalenian age were found, these occurring in another cave hard by, the Grotte des Fées. The writer was kindly given every facility to examine the finds, and the section according to his determination is as tabulated below.

Pair-non-Pair.

Extent: 5 metres 15 centimetres in length, 4 metres in width, 4 metres 55 centimetres in height (according to the writer).

Beds	*Depth*	*Nature*	*Age and Contents*	*Fauna*
A.	·20	Cultivated earth		
B.	1·55	Red earth, sandy clay Lumps of limestone Bones, scattered flints	Upper Aurignacian Gravette points Also some Proto-Solutrean tools	*Cervus* Man (? recent) *Ursus spelaeus* *Bos priscus* *Equus caballus* Birds
C.	·10	Horizontal bed Magma of hearths Flints and bones very numerous		Man (modern or Neolithic burial) *Ursus spelaeus* *Cervus tarandus* *Cervus megaceros*
D.	·65	Red clayey earth with flints, bones, and big limestone ashlars	Middle Aurignacian Ivory worked tools Keeled scrapers Beaked *burins* Spatulate points	*Cervus capreolus* *Elephas primigenius* *Rhinoceros tichorhinus* *Equus caballus* *Bos priscus* Birds
E.	·20	Kitchen debris (here and there in pockets), flints, ivory flakes, and numerous bones of the stag genus	Middle Aurignacian	*Felis spelaea* *Ursus spelaeus* *Cervus tarandus* *Cervus megaceros* *Rhinoceros tichorhinus* *Equus caballus* *Elephas primigenius*

[1] See Plate IX, C.

[2] See Plate IX, D.

Beds	Depth	Nature	Age and Contents	Fauna
F.	1·10	Great blocks of rock Magma of flints and bones Traces of hearths	Lower Aurignacian (Châtelperron)	*Bos priscus* Fish Birds
G.	·75	Earth and sandy clay mixed with small grains of quartz Muddy earth Red clayey sand Traces of hearths Lumps of limestone decomposed on the surface, broken bones, chipped flints	Mousterian Side-scrapers and Points	*Bos priscus* *Rhinoceros tichorhinus* *Cervus tarandus* *Cervus megaceros* *Cervus elaphus* *Elephas primigenius* *Equus caballus* *Ursus spelaeus* *Felis spelaea* Birds
H.	·55	Clayey earth and clayey sand Reddish grey sand Yellow clay Flints and bones Traces of hearths Coprolites of hyenas	Early Mousterian or Acheulean (?) *Coups-de-poings*	*Bos priscus* *Rhinoceros tichorhinus* *Cervus tarandus* *Cervus megaceros* *Cervus elaphus* *Elephas primigenius* *Equus caballus* *Ursus spelaeus* *Felis spelaea* Birds

As the deposits were removed it was found that there were engravings on the walls. These became quite clear when cleaned by a pressure-spray, such as is used for spraying vines. Now the wall engravings at Pair-non-Pair were covered by Upper Aurignacian deposits, and so were probably made by Lower Aurignacian Man.

D. Teyjat. In the cave of Teyjat, not far from the station of Javerlhac, on the railway from Angoulême (Paris-Poitiers-Bordeaux line) to Thiviers (Paris-Limoges-Périgueux line), there is a block of stalagmite which is covered by fine engravings, amongst which occur horses, oxen (including a group composed of an ox following closely behind his cow), reindeer, bisons, stags and hinds[1].

This cave only contains two deposits of Upper Magdalenian age (M. 5 and 6); the lower showing harpoons with a single row of barbs; the upper, harpoons with a double row of barbs. The block of stalagmite was partially covered by deposits; and a portion which had become detached, bearing the engraved figure of a bison, was actually found in the lower layer.

[1] See Plate XIII, 1, 2.

II

When the entrance to the cave or corridor containing the drawings was obstructed either by a fall from the roof, or better still by deposits containing dateable stone implements before Neolithic times.

For examples we might take:

A. *La Mouthe, near Les Eyzies.*

This cave is situated near the hamlet of La Mouthe in the commune of Tayac, near Les Eyzies station, on the line from Périgueux to Agen. The cave is on the top of a wooded hill, and commands a fairly wide view.

A large vestibule, dry and well lighted, is first entered. This vestibule originally contained deposits over a yard thick, but is now completely excavated.

The following layers were determined when the cave was excavated under the direction of M. Rivière:

A super-stalagmite layer partially cemented with stalactite, exclusively Neolithic, composed of a greyish-black hearth with fragments of rough black pottery, a number of flints, human bones, and a modern fauna. Two fragments of polished stone axe were found.

Under this layer comes a variable thickness of stalagmite, and under this again are two sub-stalagmite layers, containing Upper Palaeolithic implements. The first of these is composed of Magdalenian hearths, and it was in this layer that the famous decorated lamp was found. The second or bottom layer, which is mixed with clay and rests on the native rock, contains probably Mousterian and Aurignacian cultures. When these deposits were removed a gallery at the back of the vestibule was exposed, which the deposits had completely masked. This gallery itself was partially filled with natural deposits of cave earths.

On exploring this gallery the walls and ceiling at certain points were found to be engraved with figures of mammoth, reindeer, ibex, bison and a tectiform which was in part painted[1]. The fact that the entrance was entirely blocked by dateable deposits indicates that the art in the gallery was made in earlier times, when primitive man still had access to it. By Neolithic times it was blocked.

[1] See Plate XXV, E, F.

B. *Bernifal.*

Further up the valley of the Beune, on the side of a tributary valley, lies the cave of Bernifal, some five miles from Les Eyzies. Entrance to the cave is gained to-day by an iron ladder, down a natural chimney, rather like a well, the original entrance which opened lower down on the hill-side having been completely blocked by an ancient land-slide.

The cave contains no trace of pottery or of Neolithic culture.

But in two or three places the walls have been engraved with the figures (some of them quite large) of mammoths, tectiforms, etc. These must have been made by Palaeolithic Man, the entrance being blocked before Neolithic times, as there is no trace of the latter culture.

C. *Gargas.*

There is a cave at Gargas, not far from Montréjeau in the Pyrenees. The cave walls are emblazoned with figures of the human hand, some showing finger joints cut off[1]. There is also a panel of complex engravings, amongst which horses, an elephant (probably a mammoth), and a bird (a great rarity in Palaeolithic art), can be distinguished. The vestibule of the cave only contains three archaeological deposits, resting on a layer, which, though sterile as far as Man is concerned, contains an astonishing number of cave bear remains. The bottom archaeological layer contains a Mousterian culture with large green quartzite implements, etc.

Above this, with a slight intermingling at the point of contact, there is a Middle Aurignacian culture, and above this again, a topmost deposit containing Upper Aurignacian implements with *burins Noailles*, etc. On this deposit lie blocks of rock, which fell down when the entrance to the cave collapsed, and was completely masked. The cave was only recently rediscovered.

There is no trace of Magdalenian or Neolithic culture, and the cave entry seems to have been completely blocked before Magdalenian times. As far as we know, Mousterian Man did

[1] See Plate XVII, A.

not draw, and so the Gargas engravings and paintings are, almost certainly, wholly of Aurignacian age. Incidentally, as we shall see later, the human hand (which figures so prominently at Gargas) seems to have been one of the first objects ever painted.

D. *Niaux.*

A further interesting example may be cited from the cave of Niaux.

This cave is a few miles from Tarascon-en-Ariège. The original entrance was probably the big rock shelter which opens above the little village of Niaux. To-day the entrance is to be found on the hill-side above the forge, a mile from the village; and is exactly opposite the rock shelter of La Vache, which is situated on the other side of the river. The total length of the cave is considerably more than 1400 metres. It is about 100 yards above the river (Vic-de-Sos) and 668 feet above sea-level. It plunges straight into the hill.

For the first 300 yards there is abundant evidence of Neolithic habitation. Any chance digging will bring to light bits of pottery, etc., but at this point all traces of the Neolithic cease abruptly. The passage begins to sink, and a shore line is noticeable on both sides of the gallery. It is obvious that at one time or other there has been a lake here, some two yards deep, and several hundred yards in length, which completely barred the way in exactly the same manner as all further advance beyond 1114 yards is barred to-day except to those who care to bathe.

The abrupt absence of pottery seems to indicate that this first lake existed in Neolithic times. On the other hand, in late Palaeolithic times it seems to have been absent, for we get one of the most splendid series of Palaeolithic paintings known[1], some 600 yards from the entrance, and well beyond the limits of the shore line which indicates this barrier lake.

E. *Altamira.*

The cave of Altamira which opens on the hill-side some miles from the village of Santillana del Mar, not far from the town of Torrelavega, on the railway from Santander to Madrid, contains no trace of the Neolithic. The entrance

[1] See Plates XXI, A–E; XXII; XXV, A.

was blocked at the end of quaternary times, and was only discovered in 1868, by a chance hunter, when digging out a fox which had gone to earth at that place.

III

Types of Animals figured.

Many of the animals figured either are now extinct, or are animals which occur in climates differing greatly from the climates of France and Spain at the present date.

In this connection the presence of stalactite over the engravings should be considered, also the scratches made by bears in sharpening their claws. The occurrence or non-occurrence of stalactite on a cave wall is a mere matter of chance, depending on minute fissures in the porous limestone rock. Its growth may be fast or slow, but at all events a thick deposit takes a certain time to grow, even if only a century or so.

Now some of the drawings of extinct animals are covered by thick layers of stalactite, sure proof that they were not made by modern hands; and they could not have been made a century or so ago, because in those times the existence of certain extinct animals (such as a mammoth) was hardly dreamt of. They must have been made then at a time when the artist saw these animals roaming around him. This, in the case of the mammoth as far as France is concerned, has not been since quaternary times.

That stalactite is a very variable growth is shown at the cave of Pasiega, where there are two heads of hinds painted on the two side walls of a niche facing one another. The one head is covered with stalactite, whilst the other is quite free from any such covering.

In many caves, whether decorated or not, we find the marks left by animals sharpening their claws. At Castillo, an important cave near the small watering-place of Puente Viesgo, about 15 miles from Santander, North Spain, the claw marks sometimes cut the paintings, which must therefore be the older, and in other cases the paintings cut the claw marks, so that these must have been there first. No large animal goes into the depths of long caves in Spain

to-day to claw the walls, and as the paintings are in some cases older than the claw marks, they must have been made some time ago. The only animal likely to have left these claw marks is the cave bear (*Ursus spelaeus*) which became extinct at the end of Magdalenian times. Man seems therefore to have been contemporary with this animal, and to have been decorating the cave at Castillo at a time when the cave bear used the cave walls to sharpen its claws.

IV

Style.

Some of the engravings are made in peculiar styles, and sometimes engraved bones in identical styles are found in the deposits in layers, which can be referred to definite periods, judged by a consideration of the industries they contain.

This not only gives us a proof of the authenticity of the cave drawings, but incidentally helps us to date them. We shall deal further with the subject later on in this chapter.

V

Culture.

It may be further noted that whenever we get a cave art of early Stone Age aspect we find traces of Palaeolithic culture in the form of implements, graving tools, etc. But, in the rock shelters of south Spain, where the walls are emblazoned with a different type of art, made by a very different type of Man, there is no trace of any of the early Stone Age tools.

Having demonstrated the Palaeolithic age of this cave art we can now proceed to consider its distribution and technique.

1. DISTRIBUTION.

Cave art has a much more limited distribution than the *art mobilier*[1]. There is one centre in Dordogne, with a concentration round Les Eyzies. Here are to be found such caves and grottoes as Gorge d'Enfer, Tayac, La Mouthe, Font-de-Gaume, Combarelles, Bernifal, La Calévie, La Grèze, Cap Blanc, and Comarque. As outliers to this dis-

[1] Might perhaps be translated "Home Art."

trict may be mentioned Teyjat, which lies north-west of Périgueux, near the little village of Javerlhac, not far from Nontron; and Pair-non-Pair, which lies close to the junction of the rivers Dordogne and Garonne near the little town of Bourg-sur-Gironde.

The second centre is the Pyrenees. Starting from east to west, we find in the Ariège district the caves of Niaux, Bedeilhac, and Le Portel, the latter close to the station of Baulou on the railway line from Foix (Ariège) to St Girons. Further westward, close to St Girons itself, we have the famous Tuc d'Audoubert. Close to this is another cave, not yet described, called the Trois Frères, which contains a human figure, partly painted, partly engraved, which is represented as if wearing a mask of stag's horn on its head and a tail. There are also drawings of lions and owls. At the great cave of Mas d'Azil a few poor drawings of Palaeolithic age are found. Further westward again, not far from the little town of Salies-du-Salat, is the cave of Marsoulas, at the entrance of which deposits containing Upper Aurignacian and Upper Magdalenian industries have been found. Another place further west where Palaeolithic art occurs is the cave of Gargas before mentioned, which lies not far from Montréjeau, near the little hamlet of Aventignan. Still westwards at Isturitz there are said to be bas-reliefs of Solutrean age. These may well be a cultural survival from Upper Aurignacian times.

The third centre is in north Spain, north of the Cordillera Cantabrica, which is really a continuation of the Pyrenees. Here we find a large number of paintings and engravings in caves.

Amongst others may be mentioned Venta de la Perra, with its engraving of a bear; Covalanas, with its frieze of hinds made in the punctuation or dotted style; Castillo, famous not only for the many and varied manifestations of art that occur, but also for the extraordinary number of deposits found at the entrance of the cave, there being twenty-five layers, twelve of them containing archaeological remains. Close by is the cave of Pasiega, specially rich in early styles of painting. Not very far from Pasiega there is Hornos de la Peña, which contains hardly anything but engravings, and those mostly of Aurig-

nacian age. Nearer Santander is El Pendo, with its two engravings of birds, and Santian, with its frieze of conventionalised human hands[1]. Still further westward we come to Altamira itself, not only justly famous for its wonderful painted ceiling, but also for the deeper galleries which show us a rich and varied art. Going still westward we have a very primitive form of art in the cave of La Clotilde, and varied styles in the cave of Pindal.

Another example further west must be cited, Bolao Llanes, not because it contains anything of any great beauty, for it has nothing to show us but a single frieze of tectiforms. These tectiforms, however, are on the arched roof overhanging a subterranean lake, and they may have been made by old Stone Age Man, as an indication of the spot where he could get cool water, or in connection with some water magic.

Finally the two decorated caves of Buxu (Asturias) and of Candamo (Asturias) must be mentioned. The former contains figures of horse (common), bison (one), stag (common), fallowdeer (one), ibex (three) and signs. There are three series of different ages. The latter cave contains stags (ten), ox (fifteen), bison (five), ibex (four), wild boar (one), horses (eleven), chamois (two), Anthropomorphic figures (two) and signs.

Besides those mentioned there are many others which have not been named, which are of the second rank in importance[2].

Outside these three main areas, we have only a few isolated examples of drawings that from their style can be referred to the Palaeolithic art group. One small group is in south-east France. There are two caves, Chabot and Figuier, containing very crude deeply-cut engravings. These two caves occur at the mouth of the Gorges of the Ardèche, four miles from the railway station of St Juste-en-Ardèche[3]. Chabot is quite a large cave, but the engravings only occur in the vestibule in full daylight; an elephant is discernible amidst the complex of lines. Figuier, on the other side of the river (the left bank), is only a small cave containing nothing of any great importance.

[1] See Plates XVIII, B; XVII, C, D.
[2] The whole region will be more fully described in the chapter on Cantabria.
[3] Further research may discover more in this little explored area.

Two more examples are to be found in the province of Burgos, in the northern part of Spain, at the Cueva de Penches, and at the cave of Atapuerca. The style of the drawings in these caves is to be compared with some of the very earliest styles of Palaeolithic art. In south Spain there is a small group of caves which also contain samples of Palaeolithic art. Further exploration will probably add to this number. Only one, the cave of La Pileta, not far from Ronda, has as yet been properly studied. This cave opens on the side of a natural amphitheatre, on the top of the sierra. The jurassic limestone is very broken, and the cave very difficult to explore, ropes and a rope ladder being required. It contains four distinct series of paintings, the earliest of a yellow colour, to be compared with the early Aurignacian paintings of the north; the second series, in red, may be compared to the more developed red paintings of Pasiega; a third in grey-black is not unlike some of the early Magdalenian drawings of the north; though the occurrence of Magdalenian Man in the south of Spain has never yet been demonstrated in any diggings, and this series may have been made by a late development of Aurignacian or Capsian Man. Finally there is a series in coal-black, which is exactly comparable with the conventionalised drawings of Neolithic and later age, found in rock shelters over large parts of Spain, and treated under the heading of the Spanish third group paintings.

At La Pileta examples of these four series are often painted one above the other, and this has enabled Breuil to determine the relative ages of the four series of this cave; for the coal-black conventionalised series is always painted when in super-position over examples of the other three series. It is therefore the most modern. Similarly the grey-black partly obliterates examples of the yellow and the red, but is itself obliterated by the coal-black. The red drawings are found painted over the yellow, and are themselves covered by the other two, while the yellow, when in super-position, always occurs under examples of one or more of the other series, and so is the earliest manifestation of art in the cave.

In at least two places where examples of the Spanish third group occur (purely conventionalised drawings of

Neolithic and later age) there is amongst these conventionalised drawings a figure, more weathered than the rest, in a naturalistic style. Such an one for example as a horse's head (?) in the rock shelter, Palomas I, not far from Facinas, in the district near Tarifa. The other is a figure of a rhinoceros (?)[1] at the rock shelter of Valdejunco at the Esperanca near Arronches, Portugal, close to the Spanish frontier. These, however, are more properly connected with the Palaeolithic drawings of the Eastern Spanish group, which will be considered separately. Are we to consider these the last surviving relics of drawings made by the older Palaeolithic civilisations which may possibly have flourished over the whole of Spain, and not merely north of the Cordillera Cantabrica?

Elsewhere in Europe there may well be decorated caves that are yet to be discovered. One only is known, the cave of Romanelli in south Italy, in the Otranto. It contains some rather poor engravings of horses, etc., and as the Magdalenian culture never seems to have spread over Italy, they are to be referred to an Aurignacian or Capsian culture. Their general style seems to conform to the primitive Aurignacian engravings of the main groups in France and Spain. No cave art definitely referable to Palaeolithic Man has ever been found in Britain, Germany, or Belgium. The red bars painted in Bacon's Hole (S. Wales) may be of any age.

Along the east coast of Spain, never very far inland (except where broad valleys run up from the coast), there is a series of rock paintings of a different style to the ordinary Palaeolithic types. These form the so-called Eastern Spanish style, or the Spanish group 2. They are of some importance, and a future chapter will be devoted to them. They have been thought to be a local facies of Magdalenian age, perhaps even in part older. These questions will be discussed later on.

As will be noted in the chapter which deals with *art mobilier*, art, other than the cave art, has a much wider distribution. Engraved and sculptured bones are found from Cantabria to the Jura, and on to the Ukraine; as for example the engraving of the reindeer at Kesslerloch (Switzerland), the statuette of the "Venus of Willendorf"[2] (Austria), and the

[1] See Plate XXXVI, 3.

[2] See Plate XXIX, A.

engraved tusk of the Rue S. Cyril, at Kieff (Russia). It is obvious that for cave drawings to be made in any particular district, natural caves must already exist there. Suitable caves only occur in limestone and so it is not to be supposed that because in some particular district we do not find cave art, that the people of that district were not similar to the art-producing tribes elsewhere. There may have been engravings or paintings on wood or other perishable material, which therefore have not been preserved for us. Only the art of those who had the idea of making their drawings in deep caves, where the weathering cannot enter, and where even the air seldom changes, has had any chance of descending to us.

The fact that we find a similarity in the sequence of the change of styles in our widely separated main areas, indicates inter-communication between a section at least of the population.

2. MATERIALS AND METHODS USED.

The engravings were probably made with graving tools, the different types and manufacture of which have already been described; while the bas-reliefs of Cap Blanc were probably made with stone hand picks.

For the paintings the following materials were used:

1. Iron ores.
2. Carbonaceous matter.
3. Pyrolusite (MnO_2).
4. Kaolin.

The first of these gave bright red, dark red, chocolate, orange and yellow tints. The second and third gave black. The fourth, which was not used in early times, gave white.

Some or all of these materials are to be found in their natural state in the district where the art occurs. The minerals were ground up, and mixed with marrow or fat, and probably were applied in most cases with a sort of primitive brush. Palettes have been found with colouring matter on them, and also hollow bones serving to hold the powdered colour.

In the case of some of the dotted-outline drawings, each dot is shaped, and in this case either a shaped brush or a wooden stamp covered with skin may have been used. The lighting of these caves must have been rather a problem to

prehistoric Man. A long deep cave like Niaux or La Pileta has to be negotiated to-day with the help of acetylene lamps; and it would be no joke, even for primitive Man, to find himself a mile in the hill-side with a lighting apparatus which had gone out. A few well-shaped lamps have been found, such as the sandstone one with the carving of an ibex at the base, which came from the Magdalenian layer of the cave of La Mouthe. It still contained carbonaceous matter.

In all probability the broken skull or bones of some animal were more commonly used. Human skulls were certainly sometimes partially shaped into cups, no doubt serving primitive man for drinking vessels.

The lamp fuel was probably marrow, which came from the numerous bones split longitudinally (Man is the only animal who splits bones longitudinally to extract marrow), and the wick was probably moss. The Eskimos, who most resemble our Palaeolithic folk, have similar lamps to-day, which are quite efficient, and give very little smoke.

As an interesting proof of the use of fat mixed with colours, one may draw attention to a bison at Niaux. There was a slight oozing of water from the cave wall, at the point where the bison was painted, not enough fortunately to destroy the painting (as is alas! only too often the case, either partially or wholly), but enough to discharge the black carbonaceous colour. The fat with which the colour was mixed prevented the water oozing in the painted area, but elsewhere, where the water had percolated, it had deposited a little calcium carbonate on the surface of the wall, roughening it. On looking therefore carefully with a side light, one can see the faint outline of the bison, smooth, and in very slight sunk relief, where the water had not been able to ooze through owing to the fat, although almost all the colouring matter had disappeared.

Incidentally there is another example of this at La Pileta, but here the outline instead of being in sunk relief, is raised, as the water oozing through the wall elsewhere than on the painted animals has removed in solution some carbonate of lime.

Of course it should be noted that other colours of vegetable origin may have been used, but these would be

unlikely to survive the great lapse of time. It is not to be thought that these paints were used exclusively for the making of cave paintings. Tattooing may very probably have been practised, for we often find a large quantity of red ochre in burials, as also in the case of the Solutrean Man discovered by Dr Obermaier in Bavaria.

3. SEQUENCE OF STYLE.

showing the relative age of one group to another; and, correlation of the age of the various paintings with the archaeological succession already traced from the various excavations of prehistoric Man's "homes."

At various places in the different caves Palaeolithic Man has painted or engraved his animals one on the top of the other. This is probably due to the fact that even in a large cave the number of places where the walls are sufficiently smooth and flat is very often limited.

As we shall see in a succeeding chapter, the drawings were not made for decorative purposes, and the individual artist did not care whether his drawings were made on a blank wall, or a wall which had received the attention of a previous artist.

Such a palimpsest tells us little by itself. The superposition of one drawing on the other, merely indicates that the one beneath is of older date than the one above. But the interval of time separating the two may be comparatively very short. Such no doubt is often the case, as at the caves of Combarelles, Teyjat, El Pendo, etc.

On the other hand when a number of these palimpsests from various regions are studied, it can be noted that there is also a definite sequence of styles, and that the same succession of styles is found in the various areas in which the Palaeolithic cave art occurs.

A general change in style over a whole area requires a certain lapse of time, and as the succession is the same from Cantabria to Dordogne, we have probably to do with definite changes of culture. The student might again be reminded that the similarity of this succession of styles in the various areas indicates an intercommunication between at any rate the artists of the areas.

When further we discover similar examples of these different styles from different archaeological layers, that can be dated from the stone implements, etc., that they contain, we are then able to realise that we have to do with definite developments of art, from the beginning to the end of Upper Palaeolithic times, corresponding to the changes in industries in the deposits. Naturally each area has also its own local peculiarities of style, species of animals figured, and so on. For example we find the mammoth figured in Dordogne, while a "warm elephant" only occurs in Cantabria. In Dordogne we get reindeer, which are practically absent in Cantabria; their place being taken by stags and hinds. We find many more tectiforms in Cantabria than we do in Dordogne. However, the main succession and sequence of styles is unquestionably the same from Cantabria to the Pyrenees and Dordogne; and apparently is somewhat similar in the southern Spanish outlier of La Pileta. This sequence of styles has been studied in detail by M. Breuil, who has demonstrated the existence of four distinct phases to the end of Magdalenian times.

These phases must not be confused with the series that are found in individual caves. The series are obtained from a study of super-positions of the particular cave, and it often happens that two or more series belong to one and the same phase. There would then be very little difference in style between these particular series. Naturally there would be much less difference in time between several series that all belong to the same phase, than between others that belong to different phases.

It has been already stated, as regards the actual dating of these phases, that bones engraved in a style similar to one or other of the phases have been discovered in the different dateable layers. These of course date the period of the particular phase on the cave walls which they resemble. Such, for example, is the bone engraved with the rear of a horse, which was dug up in the lower Aurignacian deposits, at Hornos de la Peña. It resembles exactly, and might almost be the sketch made for, the deep vigorous outline drawing of a horse that occurs on the walls of the vestibule there[1]. Again, bones engraved with hind's heads in a style

[1] See Plate IX, B, A.

rather peculiar to Cantabria are found at Castillo, and Altamira, in deposits of Lower Magdalenian age, without any harpoons[1]. Duplicates are to be seen on the cave walls of Castillo, etc. These are of the second phase, and are to be found in super-position cutting examples of phase 1, and covered in turn by examples of phase 3.

We have already discussed certain sites which have been covered by dateable deposits, and it has been pointed out that the engravings must be obviously older than the deposits. At Pair-non-Pair, and La Grèze, for instance, the covering deposits are Upper Aurignacian, and Solutrean, respectively; there is therefore no question of the drawings being anything but Aurignacian.

When it is found that in other areas where palimpsests occur, the lowest series sometimes resemble Pair-non-Pair and La Grèze in style, we may be fairly safe in assigning these early examples to the Aurignacian period.

We shall probably be even not far wrong in assigning isolated drawings of the same style to the same period.

At Cap Blanc, the frieze in high-relief is covered by the Lower Magdalenian layer, the only deposit of the cave. It therefore probably dates from early Lower Magdalenian times, when natural humps on the cave walls, roughly of animal form, were often noted and improved by the artists.

Somewhat similar reliefs at Comarque are therefore probably of similar age. The art of bas-relief was however practised also in Upper Aurignacian times, as witness the bas-reliefs of human beings found sculptured on blocks of limestone, in the deposits of Upper Aurignacian age at Laussel. From Upper Aurignacian to Lower Magdalenian times was, all the same, not such a long step in art evolution, since the Solutreans, entering as an invading race, appear to have had no artistic talent. The rare examples of art in this age seem to be a survival of Upper Aurignacian culture. The art of this Upper Aurignacian race was handed on to the Lower Magdalenian race, which was probably only an evolution of this earlier people, in districts such as the Pyrenees or the Alps, to which Solutrean Man never penetrated. This question of racial evolution has been already dealt with elsewhere.

[1] See Plate XI, B.

Phases and Styles[1].

Phase 1. Aurignacian Age.

Carvings and Engravings.

The first manifestation of engraving art is the so-called "Macaroni."[2] This consists of a series of more or less parallel sinuous lines. They were probably made at first with the fingers on clayey walls and later with an instrument on harder surfaces. Their meaning is of course quite unknown. Following on these and not far different in age come the first simple animal figures. These are made in the beginning by wide and deep incisions. The exact interpretation of the figure is sometimes difficult to decide, but there is always a vigour about them.

Then come figures silhouetted, very deeply incised, generally in complete profile, that is to say with only two legs, and the horns represented full face, though the animal is in profile. All smaller details are usually omitted. Towards the end of Phase 1 the engraving became quite good, as for example some of the bison at Hornos de la Peña[3]. Four legs are now sometimes shown. The eye is generally almond-shaped, not round.

Paintings.

Amongst the earliest paintings would seem also to be a species of "Macaroni,"[4] as in the case of the engravings. These are found at La Pileta with simple outline animal forms. One of the first objects to be painted was the human hand (negative or positive). Then came simple animal forms.

In the beginning, simple black, red or yellow line or dotted tracings; rarely representing anything recognisable. Later, line tracings in monochrome of animals, either partial or whole, with no attempt at modelling. Only the silhouette is indicated. As a rule only two legs out of four are shown. A study of the early paintings at Pasiega has enabled us to note two series of different dates in Phase 1.

[1] The above is partly based on an article published in the *C. R. XIII Congrès International d'Anthropologie et d'Archéologie préhistoriques*, Monaco, 1906, by Prof. H. Breuil. See Plates IX to XVI.

[2] See Plate X, A. [3] See Plate IX, E. [4] See Plate X, B.

Phase 2. Lower Magdalenian.

Engravings.

The line remains wide and deep, there is more life in the silhouette, though it is often very awkward and badly proportioned, and the four legs are sometimes coupled two and two, the horns being usually drawn in perspective; the legs are less stiff, and more carefully executed, the hoof being frequently represented with great care. Later, the line loses a little in width and depth especially towards the end, but gains in exactness. The silhouette is generally excellent, carefully correct, though the proportions of different parts of the body leave occasionally something to be desired. The work is often planed off to give the appearance of bas-relief to some parts of the animal, the head or leg, and the body is sometimes covered with scratches indicating fur, or the very hairy parts indicated by serried cuts. The dimensions of the designs vary immensely. Engraved tectiforms are found.

Paintings.

The line, which is generally black or red, broadens and widens in the correct places, so as to represent the shadows, hairy masses, and articulations. Stump drawing begins, the colours put on more or less thickly, distributed very cleverly over the animal's body, so as to shade the members and coat. Towards the end engraving is sometimes combined with painting. This is commoner however in the succeeding phase. The use of colour continues to develop; fully-painted figures are found in black, and well modelled, which remind one of charcoal stump drawings. Engraving is often used for the silhouette, and sometimes the scratches on the colour play the rôle of a penknife taking out the high lights. Certain tectiforms painted in black and red also belong to this period. The punctuation method is also used where the outlines are drawn not by a continuous line, but with a series of punctuations. These punctuations are often shaped, having obviously been made with a sort of stamp. This punctuation method which is often found in Cantabria would seem to have been a little earlier in time than the

"modelled" style described above. Often natural reliefs, on the cave wall, roughly of animal shape, were completed with paint. Thus an eye or horn, etc. would be added.

Phase 3. Middle Magdalenian.

Engravings.

The wall engravings in this phase are generally small. The lines are less deeply cut than in the preceding phase, but clear, continuous, and fairly wide. Sometimes the body of the animal is filled in with engraved lines. There are also some very lightly traced "graffiti," the lines of which are hardly visible. Beside almost formless engravings, there are figures admirable in detail, expression, and proportions, real *chefs-d'œuvres*. Painting and engraving are very often combined as at Altamira. Some of the tectiforms and huts engraved in radiating lines belong to this phase.

Paintings.

Colour, now employed to excess, completely fills the silhouette of the animal pictured; by this process the modelling is destroyed, and a figure in uniform flat wash is produced, distinctly retrograde when compared with the earlier designs. At certain places, Marsoulas for example, the surface of the body is covered with red or black lozenges, evenly distributed, the outline having been previously engraved. In this phase coarse thick outline paintings occur; sometimes, as at Pindal, combined with engraving.

Phase 4. Upper Magdalenian.

Engravings.

The engravings lose their importance, and the engraved lines degenerate into mere scratches or "graffiti" very difficult to follow, the line is less continuous than in the previous period, and sometimes, as in the case of the engraved mammoths of Font-de-Gaume, the fur in the silhouette is grossly exaggerated at the expense of the general clarity of design[1]. The

[1] See Plate XV.

silhouettes tend to be stereotyped, and attention to detail is substituted for expression and general harmony, but the result is often not unpleasing.

Paintings.

Artists, trying to revive the modelling they lost in the previous phase, use polychrome at first timidly, on monochrome (brown or red) figures, some details, as hoofs, eyes, manes, and horns being added in black; then almost all the outline becoming black, the silhouette is drawn in entirely in black, the body being richly shaded in the various tints gained by the mixture of red with black. Sometimes engraving surrounds the fresco, outlining and emphasising details. Scratchings and colour washes mark the articulations.

Animals, especially bison, are conventionalised, less "alive" than in the time when technique was less advanced. There are abundant tectiforms and signs, and conventionalised hands, painted in red.

Phase 5. Extreme end of the Magdalenian or Azilian.

Engravings.

No wall engravings.

Paintings.

The few paintings recall the painted pebbles of Mas d'Azil. At Marsoulas (Haute Garonne)—the only cave where art of this age is found—there is a long red barbed line[1], the last thing to be painted in the cave, lines of dots and a design of a cross in a circle.

Certain of the Azilian signs may have been derived from those of earlier age, such as are found painted on the walls of Castillo, Niaux and among the older series at Marsoulas.

[1] See Plate XX, A.

Phase 1[1].

Engravings	*Red paint*	*Black paint*	*Signs*
Macaroni, etc., at Hornos, Altamira, Tayac			Hands at Castillo, Pasiega, Altamira, Santian, Font-de-Gaume
Animals made with finger at Hornos, Clotilde, Altamira, Quintanal, Gargas, Niaux (ox?)	Very simple outline drawings, generally without eye. Always in absolute profile, no perspective		Discs at Castillo, Gargas Genital symbols at Gargas, and at La Ferrassie and Sergeac, carved on blocks of limestone fallen from the walls into the deposits
Fallen fresco at Altamira (here simple animals and a human figure are cut over Macaroni). The human figures and hut (tectiform) of the ceiling are also of this age			Red signs on the ceiling of Altamira
Earliest at Hornos, Pasiega, Castillo		Earliest black hand at Pasiega, Altamira, and Castillo	
Pair-non-Pair		Yellow at Castillo	Signs near the elephant at Pindal
Developed early engravings at Hornos, and similar ones at Altamira, Castillo, Pasiega	Developed early forms at Castillo, Altamira, Pindal (elephant) Series 1 and 2 at Pasiega	Simple black figures of animals at Pasiega and elsewhere	Tectiform series 1 and 2 at Pasiega Early tectiforms and scutiforms at Castillo
Venta de la Perra (?) La Grèze Frieze at Gargas	All simple outline, in absolute profile, one pair of legs, simple eye or none		
Best at Hornos, have four legs, and long eye, also an idea of profile. At La Grèze the horns are put on full face, although the animal is in profile			

[1] Sometimes divided into 1 *a* and 1 *b*. The division would come roughly, in this table, after Pair-non-Pair.

Phase 2.

Engravings	*Red paint*	*Black paint*	*Signs*
Mainly finely striated animals at Castillo	Punctuated and "splash"[1] at Pasiega	Developed black at Pasiega (simple outline)	More developed tectiforms, third series, Pasiega. Tectiforms painted over all the surfaces at Castillo and Covalanas
	Covalanas and "splash" at Pindal	Modelled at Pasiega, Altamira, Font de Gaume, Portel, Niaux?	
At Tuc, Combarelles, Cap Blanc (high relief)		Utilisations of natural bosses of stalactite helped with colour (Font-de-Gaume, Castillo)	Some of the punctuations at Altamira, Pindal, Castillo, Meaza
Bisons at Tuc (sculpture)			

Phase 3.

Engravings	*Red and Black Paintings*	*Signs*
Early "Graffiti" at Pasiega	Flat wash at Altamira, Font-de-Gaume, Castillo	Signs at Novales
Teyjat		Punctuations in various caves
La Loja	Coarse outline associated with engraving at Pindal. Coarse outline at Altamira	Inscription at Pasiega
Fish, horse at Pindal	Attempts at bi-chrome at Pasiega	
Several at Castillo, Altamira. Latest at Hornos	Feeble polychrome at Pindal	
	Mixture of paintings and engravings in various places	

Phase 4.

Engravings	*Red and Black Paintings*	*Signs*
A few at Castillo, Pindal, Altamira, Marsoulas, Font-de-Gaume	True polychromes at Pindal and polychromes at Castillo, Altamira, Marsoulas, Font-de-Gaume	Tectiforms at Font-de-Gaume
"Graffiti"		Conventional hands at Altamira and at Marsoulas

Phase 5.

Engravings	*Red and Black paintings*	*Signs*
None	None	? Red barbed band at Marsoulas

[1] Outlines formed by coarse punctuations that have run into one another.

4. ANIMALS AND OBJECTS FIGURED.

The number of kinds of animals depicted on the cave walls is much fewer than in the *art mobilier*[1]. There is a certain change in the fauna depicted in the various regions where cave art occurs. For instance, the mammoth (*Elephas primigenius*) is never figured in Cantabria, the two elephants that are there figured having short tusks, and being in all probability the warm elephant (*Elephas antiquus*). Northern Spain is however a good way south of Dordogne.

Again, the number of tectiforms increases vastly as we go south, being much commoner in the Pyrenees than in the Dordogne, where as a rule only simple hut forms occur; while in Cantabria they are exceedingly numerous. This may be due to the influence of unknown cultures living further south in Spain, or may be due to slightly different regional cults[2].

In cave art the following animals are found: bison (*Bos priscus*), ox (*Bos primigenius*), horse (*Equus caballus*), and perhaps wild ass, reindeer (*Cervus tarandus*), stags and hinds (*Cervus elaphus*), chamois or izard, ibex (*Capra ibex*), elk, mammoth (*Elephas primigenius*), elephant (*Elephas antiquus*), rhinoceros (*tichorhinus*; it is improbable that *merckii* is figured), bear (*Ursus spelaeus* and *arctos*), *Felis spelaea*, wolf, fish (trout? salmon? and tunny?), birds (penguins? and owls?), and wild boar, which is figured twice at Altamira, both examples certainly Magdalenian.

Human figures always poor, certainly in one case masked; human hands (negative or positive). A positive hand is made by dipping the hand in colour and pressing it on the wall; a negative hand is made by placing the hand on the wall and applying the colour, the silhouette of the hand being left uncoloured. Most of the negative hands are left hands, which probably indicates that Man applied the colour with the right hand, being then already a right-handed animal.

[1] This point will be further discussed in the chapter dealing with the *Art mobilier*.

[2] The reader is referred to the account of tectiforms elsewhere, and to the chapter on Cantabria.

Signs.

These according to their type are described as tectiform[1], shield-shaped, club-shaped, etc.

As has been said they increase in number the further south we go. In Dordogne, they only seem to represent huts, being shaped like a tent. In Cantabria and the Pyrenees, on the contrary, they may often represent weapons (for example certain ones at Altamira, Pindal and Niaux). Certain oval figures may represent a species of traps, made for catching animals, traps which were prepared by digging a deep pit, the mouth of which was covered by interlaced boughs.

Certain signs, from which are drawn five vertical lines, may indicate a human hand conventionalised; such for example is the figure painted on, and therefore, slightly more recent than, the polychrome bison belonging to the fourth phase, at the cave of Marsoulas.

Animals and the Phases[2].

Bison are common. They occur at Font-de-Gaume (phase 4, polychrome), Altamira (phase 4, polychrome), La Grèze (phase 1, Aurignacian), Niaux (not polychrome, but from their excellence may be phase 4, though they may be phase 2). The bison appears in the Eastern Spanish style at Cogul. There is also one certain example at La Pileta, which has alas! no head.

Ox is found in phases 1–3 in both France and Spain.

There is a wonderful display of horses at Combarelles, phase 2 (engraved, except for a few painted in black outline), and at Cap Blanc, phase 2 (high relief). Horses are to be found at all ages in cave art, from the primitive examples of phase 1, to a specimen which cuts the polychrome example at Marsoulas, and is therefore of phase 4.

Cervidae are found everywhere, in all the phases. Except that further south in Cantabria the reindeer is completely absent, or at any rate doubtful (although its bones have been

[1] See the plate of tectiforms, Plate XXVI.

[2] It is by no means the animals commonest in a period that are most frequently figured. In fact prehistoric Man probably used the magic of the caves especially for animals that were less abundant at the moment.

found in the deposits); the place of the reindeer is taken by stags and hinds, which are rarer in the Dordogne.

Chamois is rare, but at least two examples (phase 1) are found at Pasiega and at Candamo and in the Eastern Spanish group.

Ibex occurs everywhere, especially in the early phases.

The elk is very rare, but one example seems definite from Altamira, phase 3 (?). In the Eastern Spanish style the elk is found at the Cueva del Queso, and at Minateda.

The mammoth is common in Dordogne, occurring especially at Font-de-Gaume, phase 4, Combarelles, phase 2, Bernifal, phase 2, La Mouthe, phase 2 (?).

Possibly the figures of elephant in the Pyrenees at Gargas (Aurignacian) are also meant for mammoth. At the Trois Frères (near St Girons) there is also an engraving of a mammoth.

The cave of Chabot, at the mouth of the Gorges of the Ardèche, in south-eastern France, contains some rough indeterminate engravings, possibly of Aurignacian age. The writer satisfied himself than an elephant could be distinguished, though the species is quite indeterminate; there are no tusks indicated. There is another possible one on the opposite side of the river at the cave of Figuier.

In Cantabria there are only two elephants, with short tusks, probably of phase 1, which may represent the "warm elephant" (*Elephas antiquus*). These are found at Pindal and Castillo.

Rhinoceros. Figures of rhinoceros are distinctly rare. There is a painting in red of a hairy rhinoceros at Font-de-Gaume and also a second head in red near by (phase 1 *b*). At Combarelles there is an engraving (phase 2), and possibly one at Comarque (phase 2).

As regards the Pyrenees, an indeterminate animal at Niaux may be meant for this beast, and an excellent example occurs at Trois Frères (St Girons).

It is absent in Cantabria, but may occur at La Pileta.

It is possibly to be recognised in the Eastern Spanish style in the yellow or earliest series of the cave drawings at Minateda, and may be the interpretation of an animal which occurs at the rock shelter of Valdejunco at la Esper-

anca, near Arronches in Portugal, beneath the conventionalised drawings of the Spanish third group.

Bear. Bear is very rare, only occurring for certain at Teyjat (phase 3), Combarelles (phase 2), Font-de-Gaume (phase 1), Comarque (phase 2), Trois Frères (phase 2) and Venta de la Perra (phase 1), Kortezubi (Biscaye).

Lion. The lion is found at Font-de-Gaume (phase 2) and Combarelles (phase 2) in the Dordogne. A very poor example occurs at La Clotilde, in Cantabria, and there are lions' heads as well as a figure of the entire animal[1] at the newly discovered cave of the Trois Frères.

Wolf. Wolf has been figured at Font-de-Gaume; it is possibly to be recognised at La Haza (phase 2) and La Loja (phase 3) in Cantabria; at Altamira (phase 4); and at Combarelles (phase 2).

Salmon. A salmon is found in bas-relief at the Gorge d'Enfer, probably of phase 2 by analogy with some somewhat similar high reliefs of animals of definitely dateable Lower Magdalenian age at Cap Blanc, five miles away[2].

A couple of trout are engraved on the floor at Niaux (Ariège), possibly Lower Magdalenian, a finely engraved tunny fish at Pindal (Cantabria), phase 3, and one or two indeterminate species of the grey-black series at La Pileta.

Birds. In Palaeolithic times they were only figured as far as has yet been discovered in three places. A group of two birds (possibly penguins and probably of Lower Magdalenian age) at the cave of El Pendo, in Cantabria; one short plump bird with a long beak, probably Aurignacian at Gargas, and a few owls at the newly discovered cave of the Trois Frères, near St Girons.

Humans. The human figure, as has been said, is always poor. It is found at Combarelles, in Dordogne, at Altamira and Hornos de la Peña, in Cantabria, and in the Pyrenees, masked with stag's horns and a tail at Trois Frères, also at Marsoulas. At Hornos de la Peña it would certainly be of Aurignacian age, while Trois Frères and Combarelles should certainly be referred to the Magdalenian period.

[1] Just under the engraving was found a *burin* in a niche in the wall. It was possibly this tool that was used in making the figure.

[2] Reliefs of Upper Aurignacian age also occur in the deposits at Laussel. The fish may be of this earlier age.

Human Hands, both positive and negative, occur at Font-de-Gaume in Dordogne, also at Altamira, in Cantabria, but they are especially frequent at Castillo, near Puente Viesgo, in the province of Santander, North Spain. Here there is a complete frieze of hands. In this cave they are all negative. They are also very common (negative) in the cave of Gargas in the Pyrenees, where they have the further peculiarity of appearing to lack some of the end joints of the fingers. This is of particular interest, and is more fully dealt with in the chapter on Magic.

There is also a frieze of conventionalised hands of a peculiar type, attached to conventional arms, in the cave of Santian in the Santander district. These hands are designed. This is the only decoration in this particular cave.

Finally, as has been pointed out, certain special types of tectiform, consisting of a horizontal line from which is drawn five vertical ones, may represent conventionalised human hands.

This last group of conventionalised hands are sometimes quite late, as for example the one at Marsoulas, already cited.

They are also found at Altamira, on some painted (phase 2) bisons, though they themselves are of much later date (phase 4).

With the exception of this latter example, all representations of hands are Aurignacian, and fairly early at that. They are some of the earliest figures drawn by Man.

It may be well to note here, that a block of limestone, on which a negative hand was painted, was dug out of deposits of Upper Aurignacian age into which it had fallen from the wall of the rock shelter of Blanchard at Sergeac, by M. Didon; a further demonstration of the Aurignacian age of the painted hands in the caves.

Signs.

As has been stated before the number and variety of tectiforms increase, as we go to the Pyrenees, and then to Cantabria. Their exact significance is of course in most cases unknown. For the various types the reader is referred to the chapter on Cantabria, or that on how the paintings were made.

To sum up, one can say that the horse attains its maximum in the first half, and is rarer in the second half, of the evolution of cave art.

The ibex is very frequent in the first two phases, and is not found afterwards.

Deer, comparatively rare at their debut, attain their maximum a little before the end, above all in the 3rd phase.

Bison, fairly rare at the beginning, are most numerous in the last phase, when they are figured in immense numbers.

Mammoth abound in the engravings of the 2nd phase, in Périgord, and reappear fairly frequently at the end of the 4th phase in "graffiti."

Ox, never numerous, appears more frequently in the 3rd phase, and is absent in the 4th.

Rhinoceros, only represented in the 1st phase, and perhaps in the 2nd.

Bear, there are about four examples in the first three phases.

Felines, there are several of the 2nd phase (one of them probably at the end).

Canides, always rare, are present in the 2nd and 4th phases.

As for Man, he is represented in the 1st, 2nd and 3rd phases only.

It is interesting to trace the points of similarity and opposition, between the *Art mobilier* and Cave Art; it is seen that the latter are considerable. For example, fish, so numerous on engraved bones, are only figured in four caves; and the engravings of horses, so numerous in the Upper Magdalenian stations, have no parallel contemporary design in what we know of the last phase of cave art.

5. *RAISON D'ÊTRE.*

As it is best to consider prehistoric art as a whole in considering the *raison d'être*, a special chapter will be given to this discussion.

CHAPTER XVI

DECORATED OBJECTS FROM THE DEPOSITS THEMSELVES[1]

As has been previously said Man lived under overhanging rocks on the sunny side of valleys, and deposits of earth, cinders, kitchen refuse, etc., accumulated on the floor around him during his habitation there. We thus find not only bones, broken lengthwise to extract the marrow, and stone weapons scattered about, or heaped together in what may have been buried hiding-places, but we also find decorative objects. There are collars of pierced shells, little ivory plaques, or pierced animals' teeth. At Sordes these pierced teeth are engraved with arrows. Man by no means kept his artistic powers exclusively for adorning the depths of caves. Many a fragment of bone, horn, or ivory, ornament or weapon, from the deposits bears witness to his artistic skill. These fragments are classed as *art mobilier*, as are also the decorated bone tools, etc., that are found in association with them. Together with these decorated objects are found stone implements that can be referred to different ages, and the bones of animals; therefore, as a rule, there is very little difficulty in dating any particular example of the *art mobilier*. As might be expected painting is very rare, damp earthy deposits would not be conducive to the good preservation of any finely-painted object. We find a certain number of bone spatulae with the remains of paint on them, such for example as the spatula carved into the shape of a fish from the cave of Rey, close to Combarelles, near Les Eyzies (Dordogne); there are also hollow bones which had been used as tubes to hold powdered colour. Some of the sculptures and bas-reliefs seem to have been painted, the Venus of Laussel[2] shows traces of red ochre, and the Venus of Willendorf, carved in oolite limestone (11 centimetres in height), was originally covered with this substance. Red ochre seems to have played a very important part in Man's home life, for not only do we find the remains of red colour-

[1] This includes, of course, *art mobilier* or small household decorated objects.

[2] See Plate XXIX.

ing on many of the sculptures, but also on the very slender Solutrean points unearthed from their prehistoric hiding-place at Volgu (Saône et Loire), which from their delicacy must have been made for a symbolic purpose, and may be therefore rather objects of art, than instruments for material use. We have already noted that ochre is used to cover the bones in many of the burials.

Some of the very rare paintings from the deposits were found at Sergeac in the rock shelter opposite to that called Blanchard. On a block of limestone probably fallen from the roof into the deposit are seen the paintings of negative human hands, one in black (MnO_2), and the other in red; the surrounding deposits contain Upper Aurignacian implements. Representations of the human hand are one of the first manifestations of art in the caves, and do not seem to occur at any much later date. It would seem therefore that the hand at Sergeac was painted rather earlier than the Middle Aurignacian age, and that the block of limestone on which it was painted fell into the deposits at a later date. At the rock shelter of Blanchard itself in deposits of Middle Aurignacian age is the debris of a bison painted in black on a more or less reddened background.

Paintings have also been found on blocks of limestone from La Ferrassie (Middle Aurignacian) and another from Laugerie Basse (Lower Magdalenian).

Though paintings are rare in the *art mobilier*, sculptures, bas-reliefs, and engravings are not so. These are found in the deposits from Cantabria to the Pyrenees, from Dordogne to the Jura, in Lower Austria, Moravia, Poland, and the Ukraine. They are especially numerous in the Pyrenees in Magdalenian times, where an extraordinary number have been found. The similarity in the style of Palaeolithic cave art over wide areas has been noted; and the same applies to the *art mobilier*. For example the conventionalised engravings on reindeer-horn of Lower Magdalenian age, found at Placard (Charente), can be compared with similar ones of similar age found in the Dordogne, at Solutré, in Poland at the cave of Maszycka, near Ojcow, and at Castillo (Cantabria). At Altamira there is a type of engraving of broken zig-zag lines alternating with transverse lines; this style

occurs, though rarely, in Dordogne, and in the Charente, and is also found in the deposits of Arlay (Jura). The deep punctuated dotted line engravings of Placard are also found in the bottom levels of Kesslerloch in Switzerland. Spiral ornamentation such as that at Arudy[1] and Lourdes is to be found in Dordogne and Cantabria (Hornos de la Peña). Types of harpoons and throwing-sticks are similar in deposits widely separated and collars of pierced sea-shells (*Purpura*, *Turitella*, and *Fusus*) are found both at Cro-Magnon, and in deposits in the Danube valley. This is significant as they must have come from the far away sea-shores, probably by barter. All this indicates considerable intercourse amongst at least certain classes of the Cro-Magnon folk.

The Pyrenean *art mobilier* was the first to be studied by M. Piette at a time before the Aurignacian period had been recognised as a separate stage, occurring before the Solutrean age, and when it was believed that the whole Upper Palaeolithic epoch could be explained by a slow evolution *in situ*. Piette suggested that evolution in the art was from sculpture to bas-relief, and engraving. It was also suggested that this was the psychological development of art. Man would begin by trying to make an exact image of the object, that would be sculpture. As his material, bone or horn, was too thin, it would degenerate into what might be described as two bas-reliefs placed back to back. This would rapidly lead to the representation of the object, either by a single bas-relief, or to cutting the bone or horn into the shape of the animal, thereby getting a sort of silhouette of the object. This is known in France as the *contour decoupé*, and a great number of these have been found. Bas-reliefs in their turn would give rise to plain line engraving. At the time the objects found by M. Piette seemed to support this view, but insuperable difficulties arose later when he excavated the Grotte du Pape, Brassempouy, and tried to correlate the sculpture there with that found in the deposits of the Pyrenees. At Brassempouy the succession of Palaeolithic deposits is:

A. A deposit rather to one side and not in direct sequence to the rest, but certainly later than *B*, containing line engravings now known to be of Magdalenian age.

[1] See Plate XXX, J, K.

B. Deposits containing "laurel-leaves," known to be Solutrean.

C. Deposits containing the statuettes, now known to be early Aurignacian.

D. Deposits of Mousterian age (?).

We now know, in the light of more recent research, that the deposits of Brassempouy containing the statuettes of negroid human figures are of early Aurignacian date, while the main sculpture-bearing deposits of the Pyrenees are early Magdalenian. Piette was completely misled, and the result is that his later works cannot be understood, unless the previous stages of his attempts to reconcile two totally different cultures are carefully followed. Further research has demonstrated the fact that though sculpture is far more common in the Lower Magdalenian deposits, it does occur in the Upper, and that though line engravings are often to be found in the Upper deposits they do occur in the Lower also. It is thus largely a question of proportion and, though the proportion of engraving to sculpture does vary at different levels, there is no slow development of technique showing the evolution of engraving from earlier sculpture. For example the occurrence of sculpture at Teyjat may be noted, the deposits being of Middle Magdalenian age (M. 5), and line engravings occur in one of the lowest Magdalenian deposits (M. 1, 2) at Placard.

M. Piette laboured under great difficulties, he was a pioneer, and the Pyrenean caves where most of his work was done have not a normal succession, the Solutrean culture being absent, as has already been pointed out in the chapters concerning the Upper Palaeolithic age. At different periods of his life he called the deposits by various names, sometimes corresponding to the predominant animal of the period, and sometimes after caves where they were specially developed. His nomenclature is by no means consistent, but the following table will give a general idea.

After prominent animals	*After caves*	*After types*	*Modern equivalents*
Cervidian	Lorthetian	Engravings	M. 6. Upper Magdalenian.
Tarandian	Gourdanian	Engravings	M. 5. Middle Magdalenian.
Bovidian	Arudyan	*Contour decoupé*, Bas-relief, Sculpture	M. 4, 3, 2, 1. Lower Magdalenian.

No very strict correlation between these various groups should be attempted and as has been said it is really only a question of the proportion of sculpture to engraving. Though Piette's theory of the evolution of Magdalenian art may be in part true, it is by no means exclusively so.

We recognise to-day two distinct and separate series, both of them containing sculpture, bas-relief and engraving.

The first is Aurignacian, the second Magdalenian. Hardly any definite work of art made by Solutrean Man has yet been discovered, and it is probable that the Solutreans (except perhaps when in immediate contact with some other artistic folk) never decorated their bone and horn implements. The peculiar statuettes of stag, the bodies covered with punctuations from Solutré, and the bas-reliefs at Isturitz are said, however, to be definitely of this date. Further east at Předmost in Moravia, there are evidences of art, but here, though the industry appears to be of very early Solutrean age, it is not far from, and indeed may well belong to, the eastern centre of Upper Aurignacian culture. This will be discussed a little later.

FIRST SERIES. AURIGNACIAN.

The decorated objects of Aurignacian times are much rougher, and not nearly so finished as those of the later Magdalenian age, they have however a wide distribution, examples occurring from Cantabria to Austria.

Sculptures.

The Venus of Brassempouy (Lower Aurignacian).
The statuettes of Mentone.
The Venus of Willendorf (Upper Aurignacian).

Bas-reliefs.

The series of human figures of Upper Aurignacian age found in the deposits at Laussel, dated thus because found with such typical implements as gravette points, etc.

There are also a series of bas-reliefs representing horses and the feminine symbol, etc., from the top of the Middle Aurignacian at La Ferrassie, Sergeac, etc.

Engravings.

A deep-line engraving of a horse on a block of limestone of Middle Aurignacian age from Termo-Pialat (Commune de Saint Avit, Sénieur, Dordogne) has been described by M. Tarel. M. Délugin has also described, from the same site, a block of limestone having on it two deep engravings of human figures. The one shows the silhouette of a naked woman, the head however is represented as full face, the neck is long, the arms are not clearly indicated, the hanging breasts are not very large, the stomach is large and pendulous, the thighs are well proportioned and the buttocks do not project as in the case of the steatopygous statuette of Mentone. The second figure is much less completely finished, but there are more exact indications of an arm and even a hand. At the rock shelter Blanchard at Sergeac there are also engravings of Middle Aurignacian age discovered by M. Didon. And again the vigorous engraving of the back of a horse engraved on bone from the early Aurignacian deposits at the cave of Hornos de la Peña, Cantabria, must not be forgotten. As has been already suggested this may have been the sketch used for making the exactly similar horse, which is found engraved on the walls of the vestibule. These early Aurignacian engravings are purely outline, with only two legs but they are deeply cut and vigorous, and they remind one greatly of the definitely dated Aurignacian cave drawings of Pair-non-Pair or La Grèze. Other personal possessions are found in the deposits, such as collars of shells, sometimes, as at Cro-Magnon, of sea-shells though the sea was very many miles away, or of pierced teeth, etc., but these at this early period are not specially decorated. The early forms of wands and arrow straighteners appear at this time and they sometimes boast primitive decorations near the hole. These objects, called in French *bâtons-de-commandement*, are made from deer's antler which are pierced with a hole at the end where the horn branches. The decoration is always primitive simple geometric and close to the hole. A certain number of these Aurignacian *bâtons* have been found at Sergeac, and are very different from, and much more primitive than, the elegant examples

covered with engravings of animals, etc., found in later Magdalenian times. The early Aurignacian types may have been for use as arrow straighteners, or making pliable thongs cut from hides, while the later ones were perhaps brooches, or possibly sceptres for chiefs, in which case they would be as decorated as possible. As a modern analogy one might mention the mace, which was originally meant for use, but has degenerated into a mere symbol of dignity.

Further east in France at the Grotte de Trilobite, Arcy-sur-Cure (Yonne)[1] in an Upper Aurignacian deposit, the Abbé Parat found a piece of schist bearing engravings of rhinoceros. Further south at the rock shelter of La Colombière, near Poncin (Ain), the following industries are found: a Magdalenian, and two beds containing (according to M. Breuil) proto-Magdalenian implements. These proto-Magdalenian beds have yielded a number of engravings on pebbles and bone. Dr Lucien Mayet and M. Jean Pissot who excavated this site identified engravings of chamois, stag, felines, wild cattle, horses, reindeer, musk ox, rhinoceros (pierced with arrows), cave bear, and Man.

In Belgium both sculpture and engraving have been found, as for example, at Trou Magrite (Pont-à-Lesse), while further east there is an important prehistoric site at Předmost (68 kilometres north of Brünn) three or four metres below the surface in a deposit of loess more than twenty yards thick. The industry is of either early Solutrean, or more probably of Upper Aurignacian date. The associated fauna was: reindeer, horse, Arctic fox, snowy hare, and mammoth. Over 900 specimens of the last type were found, some being of mammoths just born, and other examples of beasts of considerable age. In the deposits was found a mammoth sculptured in double bas-relief, back to back on a morsel of ivory. There was also an engraving of a woman in a highly conventionalised style, as well as other works of art.

Solutrean "laurel-leaves" have been found in the deposit, and we are probably close to a cradle of the Solutrean people, for here at Předmost in Moravia we may not be so far from the area in which these people were developing. In that case it would be better to correlate manifestations

[1] See Bibliography, Parat.

of art found here with the Upper Aurignacian art of the west. A large number of skulls were found in these deposits, which have been already described in the chapter on Prehistoric Man.

Further east at the extreme eastward limit of the Aurignacian civilisation an undecipherable engraving on mammoth tusk was found at Kieff in the street of St Cyril. The other Aurignacian art in Russia at Mézine (Tchernigov), has already been described in the chapter on the Aurignacians.

SECOND SERIES. MAGDALENIAN.

Magdalenian art was a much more robust product, and many different varieties of style are found. These are due partly to the development of art itself in Magdalenian times, partly to styles of art of purely regional significance. As has been said the distinctive engravings of hinds on bone from Castillo and Altamira in Cantabria cannot be matched elsewhere, but with them is found a series of typical engravings which link them up with the more regular sequence. A very good place for studying Early Magdalenian art is the Grotte du Placard (Charente) where there are some six or seven layers of Magdalenian age, the bottom three of which are older than the appearance of even a prototype of the harpoon. The earliest bed is poor in art which is more flourishing in the beds immediately above.

We are also enabled to follow the divisions of the Magdalenian age into six periods by means of the *art mobilier*. This result is obtained by two considerations; firstly from a consideration of a general development of the art; secondly, from a consideration of the appearance during short definite periods of special types of decoration.

In the first case, for example, we start with rough sculptures of the heads of animals on *bâtons*, etc., these being vigorous but primitive. They are found up to the third division of the Magdalenian age. Certain high reliefs from Laugerie Basse, figuring horses, etc., are also probably of this age. In the fourth division, when the primitive harpoons appear, we find delightful little sculptures of animals, associated with engravings that are often in slight relief. The Upper Magdalenian age (M. 5) with single barbed

harpoons is the period *par excellence* for Magdalenian engraving. In the late Upper Magdalenian (M. 6), with double barbed harpoons, the engraving degenerates and becomes coarse and deep, and often highly conventionalised. Conventionalisation which up till now had been in a nascent state, becomes in M. 6 a predominant feature. At this time too we find horns often pierced with a line of large holes. Elsewhere however in Upper Magdalenian deposits at Limeuil (just where the Vézère falls into the Dordogne), the engravings which are on stone have degenerated into mere *graffiti*.

As regards the second consideration, these matters are still being worked out under Professor Breuil, and only a note or two can be given here. Round plaques with a hole in the middle engraved with rays[1] seem to be a characteristic fashion in M. 4; rods decorated with lines of little bulbs are the fashion in M. 3 and M. 4; the flat face of the half-round wands tends to be undulating rather than flat in the period before M. 5, the decorations being either in longitudinal or criss-cross lines. These are not found before M. 3. In M. 5 (their latest appearance) the face is flat and decorated with diagonal lines parallel to one another. We have already mentioned the single bevel lance-points having two lengthwise grooves which only occur in M. 3, and the throwing-sticks which only occur in M. 3 and 4; while the zig-zag patterns broken by transverse lines at Altamira, etc., are in M. 3. The concentric circles and spirals of Arudy, etc., thought by Breuil to be derived from the idea of the eye of a bison, are found in M. 3 and 4. The occurrence of spirals at this very early date is remarkable, and should be noted. The little punctuated figures at Marsoulas, M. 3, may be compared in technique with the punctuated figures painted on the cave walls also of Marsoulas; and are possibly to be further correlated with the punctuated variety of the second phase of the cave art elsewhere.

In M. 4 and 5 the surface of the body of the figure is sometimes filled with a shading of fine lines, as, for example, the ibex from Bruniquel (British Museum) and an ibex from Lourdes [2].

[1] See Plate XXVII, C.

[2] The student should arm himself with S. Reinach's "Répertoire de l'art quaternaire," where sketches of most of the prehistoric art published are given.

When we find decorations on thick horse or bison bones an old Magdalenian age is probable, as it was at that time that this fauna was common. Carvings on flat surfaces of bone are common in M. 3, the bone being replaced by horn or ivory at later dates. Much has yet to be done, and the subject will be treated of in the future by Professor Breuil; the above are only of the nature of suggestions and notes.

In North Spain, Altamira and Castillo have already been mentioned as places where engravings are common.

In the Pyrenees the classic stations are:

Grande Grotte d'Arudy, Gourdan, Isturitz[1] (amongst others with a sculpture of a lion), Lorthet, Lourdes, Mas d'Azil, Massat (with the engraving of a bear on a little piece of schist), St Michel d'Arudy. Then there is Brassempouy, and Bruniquel (the last in the Montauban region), and the Grotte Duruthy (Sordes) where pierced teeth decorated with little arrows were found.

Dordogne is a classic region containing dozens of famous deposits yielding decorated objects. Among many others may be mentioned La Madeleine, Laugerie Basse, Les Eyzies, Limeuil, etc.

Further east is the cave of Salpétrière close under the Pont de Gard. Still further east is Colombière, and the cave of Kesslerloch, near Thaingen, Switzerland, which contains amongst other engravings the famous "browsing reindeer."

Still more to the east we reach the centre of the civilisation of Upper Aurignacian date which may in part be equivalent to the Magdalenian in France, although it seems to have an Aurignacian facies.

There are only a very few examples of the *art mobilier* from Great Britain; two are pieces of bone engraved with a horse's head. Their date is by no means sure; the one was brought to Professor Boyd Dawkins as coming from one of the caves at Cresswell Crags which he was excavating; the other was described as being found by some Sherborne school boys among a heap of stones. This latter was examined in London and pronounced genuine, since it was claimed that the engraved lines were made by upstrokes not downstrokes and that this was a sure proof of its early age. There is

[1] Some of the art at this site would seem definitely to be of Solutrean age.

nothing, however, in the technique against these two being of Aurignacian date.

It would seem that in England we have to deal rather with a developed Aurignacian equivalent to the French Magdalenian similar to that which occurs at Mentone, rather than with the true Magdalenian Man himself.

An engraving of what is probably deer has been found in the floors at Grimes Graves. Is this find to be correlated in age and technique with the western Scandinavian group, say Böla for example?

The so-called Nayland engraving of a goat is more than doubtful, and the fact remains that there seems hardly any art in England. It must have been close to the northern edge of the Aurignacian civilisation, for the implements are poor and not much diversified in type, except at the one cave of Paviland in South Wales. Though Solutrean industries are present there seems no absolute proof that Magdalenian Man was ever in England, except perhaps in the south-west in very late Magdalenian times. It may be then that England never had the folk who made the profusion of works of art, both in *art mobilier* and in the caves, in the more favoured lands further south.

The reader will have already noted that the Magdalenian civilisation never penetrated into Italy, Spain (excepting Catalonia and Cantabria), or North Africa. In this Mediterranean area only the Capsian is found which is equivalent to the Aurignacian culture. It is rare to find decorative art in the Capsian deposits, and as has already been pointed out there is but one cave in the Capsian area where the true type of Palaeolithic cave art is found (Romanelli, Otranto). A horse and some debris of other figures poorly engraved on the cave walls are figured there.

As has been already noted, grouping of animals is excessively rare in cave art; it is almost as rare in the *art mobilier*. It cannot be proved that when a bone is decorated with a series of animals the artist had any idea of grouping them, or that when the handle of a throwing-stick is carved into the form of more than one animal that these have any relationship to each other. On the other hand there are one or two cases where the attitude of the animals con-

cerned indicates that there is a definite relationship between them. For example the block of schist from Laugerie Basse showing a male reindeer closely following its female, or the hunter and the bison from the same locality, or the two stags and hinds (in the same position as the first) engraved on the *bâton de commandement* found at La Madeleine (this is preserved in the British Museum). Or again the herd of reindeer from the deposits at Teyjat, where the first few animals are drawn, and the others indicated by a hedge of antlers. Or again the cow and its calf from La Vache of M. 3 age. Nor in this connection should the two troops of horse found engraved at Chaffaud, nor the otter and the fish found engraved on reindeer-horn at Laugerie Basse be forgotten[1].

CONVENTIONALISATION.

We can note an increase in the conventionalisation of the art as we advance through Magdalenian times, this is a sure symptom of degeneration. Man is, and always has been, a lazy animal. He decorated his implements sometimes from a purely artistic point of view (?), more often as a form of magic to make them efficacious, and, as in the cave wall art, definite methods of representing the animals were developed, and these traditions were handed down from one generation to another. In the cave art conventionalisation was not practised, but in the *art mobilier* the size of the bones, etc., was often a difficulty, and besides this Man's laziness came into play. Instead of drawing a naturalistic picture of the animal, he seized upon some salient points characteristic of the type and omitted the rest. For instance a horse would be represented by the head alone, full face, the essentials being a long head, two ears, an erect mane between the ears, and no horns. These essentials were then in turn reduced to their simplest terms; a horse's head became a sort of trident, the handle of which was the head, the middle prong the mane, and the side prongs the ears. All stages of the series between a well-made horse's head and such a trident have been found. At a final stage it even may be that a double trident with prongs at each end and bars between, represents

[1] The *raison d'être* of the *art mobilier* will be treated of in a future chapter to which the reader is referred.

two horses' heads facing each other, produced by that feeling for symmetry that Man always has. When we arrive at this stage however we cannot be certain. All that can be said is that outside the simplest geometric designs, the most complicated of which were the spiral or the Greek key pattern, Man never seems to have been able to develop any form of decoration that was not derived from something that he had seen. Therefore when we find an apparently geometrical decoration we may legitimately search for the original, of which the design is only a conventionalised simplification. Man had many fewer things to look on than we have to-day with our towns and structures. Again, if magic played a great part, as seems probable, it is to the main facts of life and not to chance landscapes, etc., that we must look for Man's inspiration. One of the most important things for prehistoric Man was obviously his food, and therefore it is to the animals that he ate that we must look for an explanation of the geometric signs. These traditions of conventionalisation being handed down through the generations sometimes became misinterpreted; and there is at least one case on record where the symbol of a fish was misinterpreted by the Man of later date who made it, and which he tried to re-naturalise as a fish; he however placed the head where the tail should have been and vice versa. We with our knowledge of the whole period can trace the stages of degeneration, but we see from this example that these signs had often lost their meaning for the people who made them, and had only become the symbols for decoration or magic, appropriate to the particular object on which they occur[1]. Sculpture as well as engraving is subject to this conventionalisation. A few of these conventionalisations will be treated of here, but much further work is required before they can all be dogmatically classed.

Fish. Good engravings of fish are often found; derived from them are discs or ellipses, where the eye and the tail are either absent or hardly indicated. There is sometimes a line for the backbone. These ellipses are often grouped in an ornamental pattern, and are sometimes one under the other; in some cases they are open at both ends, and finally degenerate into two straight parallel lines, if these are

[1] See Bibliography, Breuil, 1906.

drawn between two vertical lines we get a sort of ladder pattern. Naturally all parallel lines need not have been derived from fish. Sometimes the artist has made his design from the characteristic outline of the tail of the fish. These conventionalisations are best represented pictorially, and a few other series produced by M. Breuil are appended among the illustrations.

It may be interesting to point out that the employment of symbols such as we have in these cases, indicates a stage in the formation of writing. The first step towards our alphabetic writing was the symbolising of the pictures of objects, then followed the grouping of these symbols to convey an idea and pronounced words, i.e. a picture of a horse and one of a man, indicates horseman. In the last stage symbols become letters out of which syllables are made. Modern primitive people also conventionalise drawings producing pictorial or geometric patterns. Many Papuan and other conventionalisations have been studied by Dr Haddon, whose works on this subject should be studied by those interested in this side of art.

The following list includes most of the animals figured in the *art mobilier* (of Magdalenian age except where otherwise stated):

Bear	Gourdan, Laugerie Basse, Lourdes, La Madeleine, Massat.
Birds	Andernach, St Michel d'Arudy, Bruniquel (Montastruc), Gourdan, Lourdes, Mas d'Azil, Souci, Teyjat, Raymonden.
Bison	Common at many localities.
Cat (wild) ...	St Michel d'Arudy.
Chamois (or izard)	Altamira, Bruniquel, Gourdan, Laugerie Basse.
Eels	Lourdes.
Elk	Gourdan.
Fish	Arudy, Fontarnaud (with hook), Gourdan, Laugerie Basse, Lorthet, Lourdes, La Madeleine, Mas d'Azil, Rey, Sordes.
Fox	Mas d'Azil, Placard.
Glutton	Laugerie Haute, Lorthet, La Madeleine (?).
Horse	Common at many localities.
Hyena	Laugerie Basse, Lorthet.
Ibex	Common at many localities.
Lion	Bruniquel, Gourdan, Isturitz, Laugerie Basse (without a head) La Madeleine.
Mammoth ...	Bruniquel, Předmost, Raymonden, St Mihiel.
Man	Fairly common at a good number of localities.
Marmot ...	Gourdan.
Musk ox ...	Bruniquel, Colombière, Kesslerloch, Raymonden.
Otter	Laugerie Basse (with a fish).
Plants (?) ...	Arcy, Gourdan, Laugerie Basse, Lorthet, Lourdes, Mas d'Azil, Placard, Veyrier.

Reindeer ...	Common at many localities.
Rhinoceros ...	Colombière, Gourdan, Lourdes, Rebières (Aurignacian age), Trilobite (Aurignacian age).
Roebuck ...	Lorthet.
Saiga	Gourdan, Lorthet (?).
Seal	Brassempouy, Gourdan, Montgaudier, Sordes, Teyjat, La Vache.
Snake	Gourdan, Lorthet, La Madeleine, Montgaudier, Placard, Teyjat.
Stag (and hind)	Common at many localities.
Wolf	Bruniquel, Gourdan, Lorthet, Lourdes, Mas d'Azil.

In later Azilian and Maglemose times we also get an *art mobilier*. In the former of these only geometrical signs occur, there being the painted pebbles which will be described in the chapter on the Azilian culture, one stone covered with meaningless lines, etc., from Sordes, and a bone engraved with a geometrical pattern from Mas d'Azil. The Maglemose folk on the other hand had quite a good naturalistic art, somewhat analogous to the French Magdalenian; but also, as has been found lately, a conventionalised art. This seems to be derived from the grouping of conventionalised human figures and degenerates into an elongated hexagon pattern.

CHAPTER XVII

CHARACTERS INDICATED IN THE VARIOUS SPECIES OF ANIMALS FIGURED BY PALAEOLITHIC MAN

ALTHOUGH a certain number of the painted and engraved animals in Palaeolithic art are indeterminate in species, by far the largest number are immediately recognisable. As has been said Palaeolithic art is a naturalistic art, and so the animals figured are closely copied from Nature. However, the drawings being in two dimensions and the original in three, a certain amount of perspective has to be employed. This is much commoner in the later Palaeolithic art than in the art of the earlier school, which drew their bisons in profile, though the horns were drawn as if the animals were facing the artist.

It may be interesting to notice what special characteristics the Palaeolithic artist emphasised in distinguishing between the following animals:

Bison and ox; stag, reindeer, roebuck, elk; hinds and reindeer deprived of horns; ibex, chamois, saiga; mammoth and elephant.

What are the essential features to be looked for in the pictures of:

Rhinoceros, horses, carnivora and felines, bears, fish, birds, pigs, humans, tectiforms?

Bison. The bison is one of the animals most frequently painted in Palaeolithic art, and is found in all the different ages. The horns of the animal depicted on the cave walls seem to have been longer than those of its modern equivalent, but at the end of Magdalenian times, when the animal began to be rare in France, we find drawings like those at Teyjat, showing horns very like the bison of to-day. An engraved bison at Marsoulas[1] represents only the head and fore-quarters of the animal; both horns are shown starting from the head, below the summit of the forehead in a line with the ear, and they curve slightly at the tips. There is a hump, a hairy dewlap, and a beard.

[1] See Plate XX, B.

The forehead of the bison is arched, and the line from it to the muzzle is curved or sometimes sinuous. The nape of the neck and hairy dewlap are tremendously exaggerated in some of the polychrome bisons at Font-de-Gaume.

Ox. In the case of the ox, the line from the nose to the top of the head is rarely undulating, the forehead only slightly arched, and the horns, starting from the top of the head above the eyes, develop above the head, running either vertically or forward horizontally. The ear, when indicated at all, is placed behind the horn, on the top of the head behind the neck; in some cases it is not represented. The lower jaw is smooth without hair, the throat has no beard and only a very slight dewlap, the head has therefore as clean-cut lines as that of a horse, and there is no hump or extensive withers. There is a very fine example of an ox painted in black on the cave wall of Castillo (Cantabria). The outline is clearly indicated though there is not much detail. The animal is lowing, with the head strained forward, both horns are indicated, only one of the fore-legs, but both back legs. The horns rise from the top of the head and curve downwards; the tail is arched and has a tuft at the end. There is no ear.

The points to be looked for then in distinguishing the bison from the ox in cave art are, the position of the horns; the line from the forehead to the muzzle, whether it is curved or straight; the presence in the case of bison of a hump and hairy dewlap as distinguished from the clean-cut lines of the head of an ox.

Reindeer. Paintings of this animal are very common in Palaeolithic art in the Dordogne and the Pyrenees, but in Cantabria its occurrence is uncertain as, in the one example in Cantabria which may be a reindeer, there is no antler. The reindeer has usually a tuft of hair on the dewlap, the antlers are heavy, sloping backwards and forming almost a half circle, the hoofs are heavy, the legs short, the muzzle rounded and blunt. There are two reindeer carved on a piece of schist at Laugerie Basse, the male following the female. The antlers of the male spring from just above the eye, the first branches projecting over the face; then they slope backwards, only to come forwards once more broadening

and becoming flattened. A tuft of hair is indicated on the dewlap, and there is a distinct hump at the withers.

Stag. The antler of the stag is straighter than that of the reindeer; it is often, though not always, more directly vertical, and the tines are different, there being only one basal pair as a rule. They are also simply tapering points, except at the extremity of the antler where they form a fused group, very different from the flat reindeer palm. The legs are long and fine, the hoofs small and delicate, and there is no hanging fur at the dewlap. The muzzle is long and delicate. There is a fine engraving of a stag in the cave of Altamira[1], where this animal is represented many times. The cloven hoofs are detailed, the legs are long and slender; the antlers sloping backwards in this case and almost as long as the body, are the most important feature. The mouth is open and the attitude alert, and the line of the neck and chest clear cut.

The special differences to be looked for in reindeer and stag are: length and elegance of muzzle and leg; growth of horns. The stag is altogether the more graceful animal of the two. In France the number of reindeer bones in a deposit vary inversely with those of the stag. The animal is to be found most frequently in Middle Magdalenian times. The remains of stag in France are common in the Aurignacian age, rarer in the Solutrean, rare in the Lower Magdalenian, very rare in the Middle Magdalenian, commoner again in the Upper Magdalenian, and supersede those of the reindeer at the end of Magdalenian and Azilian times. The art, however, as has been already said, is not especially influenced by the commonness or otherwise of the animals figured.

Roebuck (French *chevreuil*). The roebuck is distinguished by its very simple antler, there being no basal tines, and only one projecting forward higher up. The two ends of the antler run backwards, and end in two points forming a fork. There is a roebuck engraved on a bone found at Lorthet[2]. The short horns bend backwards, and are bifurcated at the tip, with no basal tines. Both ears are shown, and the clean line from the end of the muzzle to the fore-legs gives no indication of long hair; the legs are only sketched and the hoofs not shown.

[1] See Plate XXVII, G.

[2] See Plate XXVII, D.

Bones of this animal occur in the deposits principally in Aurignacian, and at the end of Magdalenian times.

Elk. The elk is a distinctly rare animal in cave art, and is easily distinguished by the peculiar curved muzzle, and the large palmated horns. There is the head of an elk in profile engraved on a piece of reindeer-horn found at Gourdan (Haute Garonne), showing only one horn, broad, palmated, and ending in four points. Another example painted in the cave of Altamira (Cantabria), has a similar palmated horn. There is an elk painted in red in the Eastern Spanish style at the cave of del Queso (Albacete)[1], which has an extraordinary muzzle shaped like a small balloon, the end of the muzzle being as thick as the top of the head. In this case also only one horn is pictured, short, broad, palmated and ending in five points. There are certainly two painted at Minateda, near Agramon (Albacete, South Spain).

There is no need to emphasise the differences between the representations of roebuck and elk, the muzzle and antlers being totally unlike.

Hind and Reindeer deprived of horns. In most cases in the painting of hinds the length of the ears and neck is exaggerated, the muzzle is always pointed, as is the short stubby tail, but the legs and hoofs are generally very sketchily indicated. Hinds, whether painted or engraved, have a long fine muzzle with hardly any enlargement at the end, and a delicately made mouth. The ears are long, pointed, and generally straight.

On the other hand a reindeer which has shed its horns has still a small oval ear, and a thick muzzle, a shorter neck and heavier body. At the cave of Covalanas in Cantabria, there is a frieze of hinds made in the punctuation style[2]; amongst them is found an animal with an oval ear and a thick muzzle, which M. Breuil has suggested is a reindeer which has shed its horns. If prehistoric Man figured reindeer at the season when it was deprived of its horns, then there would be nothing to distinguish it from the hind except the ear and muzzle. Figures of hinds are very common in Cantabria, and are found at all dates of Palaeolithic art.

Ibex, Chamois, Saiga. The ibex, which is very frequently figured, can be easily distinguished by the long curving

[1] See Plate XXXIV, C. [2] See Plate XII.

horns pointing backwards. A similar animal with short upright horns that curve backwards only at the top, is obviously a chamois. The saiga (very seldom represented) has a long erect twisted horn and an arched muzzle.

A good example of ibex is painted in black on the cave walls of Niaux[1]; the long horns, which have in this instance a spiral twist, curve backwards, the legs are short in comparison with the body, and the hoofs are clumsy.

In the engraved head of a chamois at Gourdan[2], the horns are carefully figured, springing straight from the head in front of the ear, and curved at the tip like two question marks. It is also found painted in the Eastern Spanish group at Tortosilla and Minateda.

A saiga is found at Gourdan[3], engraved in profile, the one horn spirally twisted and erect except for a very slight curve at the tip. An example has lately been found in the Eastern Spanish group at Minateda.

Mammoth and Elephant. The distinctive features of the mammoth are the hump, domed head, long curved tusks, hairy trunk, and feet rather like mushrooms, indicated by semi-circular cuts. A fringe of scratches represents the hairy coat.

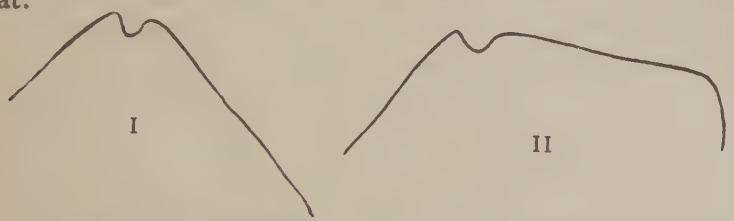


Figure showing the general outline of the (I) Mammoth, (II) Elephant.

An elephant is painted in red in the caves of Pindal and Castillo (Cantabria)[4] in silhouette with a thick clear outline; there is no sign of hair, the tusk is short and straight, and a gently undulating line slopes from the head to the hindquarters, the feet are drawn in one with the legs.

Both mammoth and elephant are represented in many places and ages, both in the caves and the *art mobilier*. The following is a table of the places in which they are to be found engraved or painted.

[1] See Plate XXII.
[2] See Plate XXX, G.
[3] See Plate XXX, F.
[4] See Plate XVIII, A.

In the art mobilier.

La Madeleine, Raymonden, Dordogne, Roche-Plate (St Mihiel), Lourdes (mammoth?)	Engravings of mammoth.
Bruniquel, Laugerie Basse, Raymonden	Sculpture of mammoth.

In caves.

Font-de-Gaume	Upper Magdalenian	Mammoth.
Combarelles, Bernifal	Lower Magdalenian	Mammoth.
La Mouthe, Tayac, Gargas	Aurignacian	Mammoth.
Trois Frères	Magdalenian	Mammoth.
Castillo, Pindal	Aurignacian. *Elephas antiquus* (?).	

The chief differing characteristics between the mammoth and the elephant are the tusks; and hair on the coat; and the outline of the back.

Rhinoceros. The rhinoceros is rarely met with in cave art. The shape of the head differs somewhat in the various examples, but the easily distinguished characteristics are the horns. The red painted rhinoceros at Font-de-Gaume[1] has the two horns, the longer on the tip of the muzzle, and a shorter one springing from between the eyes; there are indications of a sort of mane or beard, the body is heavy, and legs short. The engraved rhinoceros of Aurignacian age on the fragment of schist found at the cave of the Trilobite (Arcy-sur-Cure, Yonne)[2] is in profile, and shows once more very clearly the two short upward curved horns and the rounded clumsy nozzle. The rhinoceros head of Magdalenian age engraved on a piece of stalagmite from the Grotte de Gourdan[3], near Montréjeau, except for the two distinctive short horns, has much more the head of a dog, the short upright ears are well marked.

The head of a rhinoceros is to be found engraved on the cave wall at Combarelles (phase 2) and another from the deposits at Colombière (Ain)[4] of proto-Magdalenian age, one at Lourdes, of Magdalenian age, and one from Rebières of Aurignacian age.

One example in the Eastern Spanish style is to be found at Minateda, and one of unknown age but in the *milieu* of

[1] See Plate XXI, F.
[2] See Plate XXX, H.
[3] See Plate XXX, I.
[4] See Plate XXVII, A.

the Spanish third group at Valdejunco á la Esperanca, Arronches (Portugal).

Horse[1]. In Palaeolithic times there seems to have been several species of horse; this is well shown in the cave of Combarelles, where engravings of horses are common. In some examples the muzzle is much finer than in others, and the mane and tail are often quite differently figured. The little black horse painted in the cave of Niaux[2] has a short hogged mane indicated by two rows of dashes, the legs and hoofs are rather clumsy and the tail long. An ivory statuette of a horse was found at Lourdes in the Grotte of Espèluges. This horse is much longer in the neck than the little horse of Niaux, and has a well-defined mane, part of the legs and tail are broken off, and the proportions are far more elegant and graceful than in the painted horse, and the coat is indicated by fine stippling. Much can be determined from a consideration of the mane of the horse, as well as from the bones that occur in the deposits; a mane is always marked, which when the horse's head comes to be represented conventionally resolves itself into the central prong of a three-pronged fork. The lines of the head are always fairly clean, and only the slight beard of the horse is shown

Carnivor and Feline. Indeterminate animals with a square-ended jaw, either long, oblong, or short and square, are usually referred to as carnivora; good examples of these animals are rare. One is engraved on the walls of Combarelles[3] in silhouette, the hind-quarters being left unfinished; one leg and fore-paw, a square oval head, heavy jaw, and short upright ear are shown. The carved statuette of a feline in soft stone was found at Isturitz, here again we see the very well developed square jaw, and the short alert ear; the statuette is broken, and most of the legs and the paws are missing. An example is to be seen at Font-de-Gaume, where there is also a painted figure of what is probably a wolf; and the newly-discovered cave of Trois Frères, near

[1] For further discussion in regard to the various breeds of horses in Palaeolithic times see:

Piette. *Matériaux pour l'Histoire primitive de l'Homme*, xxi année, 3 série, tome iv, Sept. 1887.

Cossar Ewart. "The multiple origin of horses and ponies," *Transactions of the Highland and Agricultural Soc. of Scotland*, vol. xvi, fifth series, 1904.

E. H. Pacheco. *Los caballos del cuaterndrio superior según el arte paleolitico.*

[2] See Plate XXII.

[3] See Plate XI, A.

St Girons in the Pyrenees, also contains the engraving of a lion and of some lions' heads figured full face.

Bear. This animal is rarely found, the only good examples on the cave walls being at Combarelles (Les Eyzies, Dordogne)[1], Venta de la Perra (Cantabria), and Teyjat, near Javerlhac (Dordogne). The ears are small, the two shoulder blades indicated by a little hump, the jaw square, and where the paws are shown they are armed with long claws. In the cave of Teyjat the bear is engraved on a block of stalagmite[2], and is quite clear although the engraving of a horse partly cuts the design. The animal has its mouth open, and head down, and is shambling along as if following a trail; the ears and all four legs are indicated, and the paws are furnished with claws. At Venta de la Perra the bear is much more sketchily drawn, but again the head is down and the beast shambling. A bear is also figured at Kortezubie (a cave occurring between San Sebastian and Bilbao).

Fish. As has been stated fish are very rare in cave wall art, and by no means common in *art mobilier*, except at the end of Magdalenian times, when they are often found highly conventionalised; but there are examples of them in bas-relief, engraving and painting. The fish carved in bas-relief on the roof of the cave at Gorge d'Enfer has a well-defined outline, the eye and gills are shown, and it resembles a salmon. Two fish are engraved on the floor at Niaux[3], the details rendered with such care that they are recognisable as trout; the backbone is indicated by a line from the back fin to the curved line representing the gills, the top fins and the eye are shown. The engraved fish on the right-hand side of the cave of Pindal[4] is claimed by M. Priem to be a sea and not a fresh-water fish, and is thought to be a tunny. The tail is rather exaggerated, having a very wide spread and tapering to fine points, the fins, eye, and backbone are shown. Three red punctuations have been superimposed. At the cave of La Pileta far away from the sea or running water, perched high on the top of the limestone Sierra, we once more come across fish[5]. This time they are painted in grey-black, one fish in particular being very well preserved although other animals and conventional signs have been painted over part of it. It resembles a plaice in shape, the

[1] See Plate XI, A. [2] See Plate XIII, 1. [3] See Plate XXI, C.
[4] See Plate XVIII, D. [5] See Plate XXXVI, 2.

outline is mostly emphasised by a double line, and the tail is clumsy, the lower half being thicker.

Birds. Birds are not often found in Palaeolithic art. There is an engraved bird at Gargas on the cave walls among a medley of other engraved animals; it has a long neck and bill, a plump oval body with no tail and both legs are shown. It is not unlike an ibis. In the cave of El Pendo two birds are engraved, one over the other[1]. Only the outlines are well defined, a few scratches indicating plumage, and no wings being represented. In only one case are the legs shown; in another there seems to be a crest on the back of the head. Both birds have short, rather broad beaks and resemble penguins. In the Eastern Spanish group two birds are figured at Cantos de la Visera[2].

Wild Boar. In the cave of Altamira there are paintings in black and red of wild boar. One of the animals is represented at the gallop; it has a sort of upright mane and beard, the snout is long, the fore-quarters very heavy, sloping towards the hind-quarters which end in a curly upright tail, and the cloven hoofs are carefully painted.

In the Eastern Spanish group wild boar are figured at Charco del Agua Amarga, at Valltorta, and at Minateda.

Tectiforms. In the cave of La Pasiega there are a great number of "tectiforms," generally painted in brown and yellow, but sometimes in red[3]. It is impossible to be certain what they represent. They are of all shapes and sizes, oval, oblong, shield-shaped, crescent-shaped, bars, waving lines, lattice work, and a sort of ladder. In one cave an isolated group seems to form an inscription. At Font-de-Gaume the tectiforms are elaborate[4], and may represent huts and dwellings, they are often composed of a succession of lines sloping upwards to a central upright pole, and occasionally two semi-circles suggesting entrances spring from the lowest bar. Some are stippled, others drawn in straight lines, and others either rectangular or crescent-shaped are completely filled in with a flat red wash. In some cases the body of the tectiform is surrounded with rays. It has been suggested that these represent piles and that the whole is meant to figure a construction built on piles similar to some of our granaries to-day. Another kind

[1] See Plate XVIII, B.
[2] See Plate XXXV.
[3] See Plate XXVI, 8, 11, 13.
[4] See Plate XXVI, 6, 12.

of tectiform consists of a curved U-shaped line, often with external rays, the enclosed space being covered with dots. These have been thought to be traps into which the animals were driven and then killed. The dots would represent the animal's hoof prints.

Humans. Humans on the cave walls are generally very poorly executed, it being difficult to determine any anatomical peculiarities. Sculpture and bas-relief in the *art mobilier* tell us more. On the walls of the cave of Hornos de la Peña there is a curious half-human figure. The nose is human, but the leg and arm are hardly so, and there is a tail. In the cave of Altamira once more we have some semi-human creatures, one with hands held upwards as if in supplication, but no legs and a face ending in a snout. Is this a masked human figure? A seated human figure is engraved in the cave of Combarelles, this time the hand and foot are clearly drawn, and the face and attitude are entirely human. On a *bâton* from the rock shelter Mège there are representations of humans masked as chamois[1]. The feet and legs are human, the body covered with hair and a chamois head and horns in the place of the human head. At the cave of Trois Frères (St Girons, Ariège) there is the figure of a man (full face) with stag's horns on his head and a tail. The poise is rather that of the ordinary representation of a kangaroo. In the Eastern Spanish style where humans are far more numerous, there is a single-footed hunter facing a kneeling chamois painted in the cave of Tortosilla[2]; the hunter is armed with bow and arrow and is ridiculously elongated in body, and wears a hat. He is represented walking, but neither foot nor hands are very successful.

Turning to the sculptures and bas-reliefs found in the deposits, we have the lady's head (full face) in sculptured ivory from the Aurignacian deposits at Brassempouy; others carved in steatite from Mentone (one, side face with body showing great steatopygia); one of Upper Aurignacian age from Willendorf, near Krems (Lower Austria)[3] (full face though face not carved); and finally the bas-reliefs of Upper Aurignacian age at Laussel (face decayed away). All these examples show negroid characteristics, and the reader would do well to study the reproductions of these objects to be found in this book.

[1] See Plate XXX, B. [2] See Plate XXXIV, A. [3] See Plate XXIX.

CHAPTER XVIII

DISTRIBUTION OF ART IN FRANCE

FROM the foregoing account it has been seen that the Palaeolithic cave art was mainly concentrated into three groups, two in France, the other in Spain; isolated examples that exist elsewhere, such as in the cave of Romanelli in South Italy, and at Pileta in South Spain, have been already described. We must now give an account of the caves in the three above-named main areas.

The special subject in this chapter is the distribution in France, and this distribution can be divided into a northern, and a southern area[1].

The first of these comprises the numerous caves in the Dordogne and neighbouring districts; the second comprises the caves in the Pyrenees district.

THE NORTHERN DISTRICT, DORDOGNE.

Teyjat. The most northerly occurrence of Palaeolithic art is the engravings on the stalagmite cascade at the Grotte de la Mairie at Teyjat. Teyjat is a little village some two miles to the north, over the hill from the railway station of Javerlhac on the line from Angoulême to Thiviers. The engravings are found on a block of stalagmite, which was partially buried in deposits, a short way inside the cave, they are of the third phase, and include horse, bear, stag, reindeer, hind, bison, and a group composed of an ox following a cow and a second ox behind the first. The deposits are of Middle (M. 5) and Upper Magdalenian age (M. 6)[2].

Near by is the rock shelter Mège, which contains a Middle Magdalenian (M. 5) deposit, though there was no wall art, and here was found the famous *bâton-de-commandement*. This *bâton* is made of stags' horn, and covered with fine engravings of horses (one beautifully done), swans, a

[1] The best starting point is mentioned for the convenience of those who may wish to use this book in their studies on the spot.

[2] See Bibliography under Breuil, 1908, and see Plate XIII.

hind, serpents (?), and three little human figures masked with chamois heads[1].

Pair-non-Pair. This cave is best reached from the little town of Bourg-sur-Gironde from which it is only a few miles distant, following upstream the right bank of the Dordogne. The drawings here comprise horses, goat, elephant (?), chamois (?), bison (?), ibex, and are of the first phase, of very early date, and extremely indistinct. The engravings were discovered when M. Daleau was excavating the very interesting archaeological deposits of the cave; a complete monograph both on the deposits and on the art is still awaited.

Les Eyzies and district. Les Eyzies is the headquarters *par excellence* for those who wish to study prehistory either from the point of view of art, or from the deposits. It is a picturesque little village on the banks of the Vézère, and overhung by remarkable limestone rocks. The river is crossed by two arched bridges, and just above the upper bridge a little wooded island tethered like a green barge in mid-stream divides and disturbs the even flow of the water. The village clusters most thickly at the foot of a ruined castle of the tenth and eleventh centuries, which was restored in the sixteenth century. The ruins are overshadowed by the rocks in which many little chambers have been cut, as in many other cliff-sides of this region. During the Middle Ages these were the means of escape when the ferocious English soldiery and others ravaged the countryside. The French peasants scrambled up into their rock refuges, drew up the ladders, and defied their enemies.

The castle of Tayac was destroyed in 1410, when the English surrendered after a siege. The rocks, so threatening in appearance, have been a refuge for countless generations of men, outlasting the castles, even that of Les Eyzies was destroyed in the early days of the French revolution by the peasants who had been cruelly oppressed and treated as slaves by its seigneurs. From Les Eyzies the following caves and stations can be easily reached on foot or better still by bicycle. (Those marked * are of great interest.)

*La Mouthe, *Font-de-Gaume, *Combarelles, *Bernifal, *La Grèze, Calévie, Grotte de Beyssac, Grotte de Nancy à

[1] See Breuil, 1906.

Viel-Mouly, *Cap Blanc, *Comarque, *Gorge d'Enfer, Tayac.

La Mouthe is reached in half-an-hour's walk from Les Eyzies. The river Beune is crossed at the point where it falls into the Vézère, after which a side valley is followed, turning one's back on the Vézère. At the Rocher-de-la-Peine, a mushroom-shaped rock overhanging the public road—the sad name of which recalls the days when an offence against the feudal lord was expiated by the offender being thrown from the top—take the left-hand road, which leads into the valley of La Gaubère. On reaching the top of the watershed the road bears slightly to the right, till a small farm is reached where a guide and the key of the cave can be obtained.

There is a vestibule leading to a winding passage and here are to be found the engravings. At one point there is a side-turning to the right, leading at once to a small chamber or alcove. Facing the entrance is a tectiform painted like a tapestry on the wall. This was surely a magic spot; elsewhere in the little chamber there are many engravings of mammoth, ibex and reindeer, etc. In the main corridor engravings of bison, ox, mammoth, reindeer and horse are to be found.

Font-de-Gaume. To reach Font-de-Gaume the left-hand bank of the Beune is followed. Enquire for the key and a guide at the little house on the roadside at the point where a valley enters that of the Beune. The cave opens high up on the hill-side of this tributary valley; there is a long winding corridor with two passages entering it on the right-hand side, but nothing of importance is to be noted until a narrow passage in a wall of stalagmite, known as the Rubicon, has been negotiated. Then the painted animals begin on both sides, they comprise practically all the types of animals figured in cave art. In a narrow fissure at the end of the corridor, to visit which special permission has to be obtained from M. Peyrony at Les Eyzies, high up above one's head, are seen the engravings of lion and horses, and two paintings of rhinoceros. The floor of this fissure has not been lowered by the removal of much soil by water action since Palaeolithic times, for there are other paintings quite low down, and it must have been extremely awkward to draw this

upper group, so that, even supposing the ground had been at a slightly higher level, they cannot have been made for pleasure high up in this narrow fissure.

The series in this cave, judging from super-position, are:

Hands = phase 1 *a*.

Line drawings in black and red = phase 1 *b*.

Shaded black drawings = phase 2.

Frescoes in black monochrome and sometimes in brown = phase 3.

Red or brown frescoes feebly shaded and slightly polychrome = end of phase 3.

Polychrome frescoes usually red or black with tectiforms = phase 4.

The background is often composed of red washes painted over wide surfaces. As well as paintings there are engravings. Horses are engraved over a red line drawing, under a shaded black one, under a slightly shaded brown one, and under polychromes. The little head of an ox is engraved under the painting of a brown bison, another under the polychrome which in its turn covers a whole series of tectiforms. One can therefore conclude that a first group of shallow engravings (horses, ox, feline and tectiforms) is of earlier date not only than the most simple polychromes, but also than the finely shaded black drawings, and contemporaneous with the black line drawings, though rather more recent than some of the red line drawings. Another category of engravings consists entirely of mammoths, and their relations to the frescoes are quite different. This series are nearly all to be found on the left-hand side of the cave, they vary in size, and are sometimes so lightly traced that they are difficult to distinguish. On the left-hand wall to the right of a reindeer there is no doubt that the pictures of elephants are the most recent, more recent even than those tectiforms that occur on the polychrome animals, and the wide scratches representing their curved tusks are cut clearly across the polychrome bisons and reindeer. The earlier engraving is only of phase 2, while the mammoths superposed on polychrome paintings are themselves of late phase 4.

Combarelles. Combarelles is a mile or two beyond Font-de-Gaume on the same side of the valley of the Beune. The

entrance is at the back of a stable, and the cave is a long low narrow winding tunnel, both sides of which, at a certain distance from the mouth, are covered with engravings. There are only one or two outline paintings near the end of the cave. The engravings, which are mostly of phase 2, are often super-imposed and are not therefore always very visible unless carefully studied. This super-position does not seem to indicate any great difference in time as all are of phase 2. At a certain place in the tunnel the passage becomes very narrow, and it is in the little chamber just before this point that some of the best engravings occur. The animals figured on the walls at Combarelles include horse (many varieties), bison, reindeer, ibex, feline, mammoth, rhinoceros, bear and humans.

La Grèze. Continuing up the valley of the Beune we come to cross-roads, the main road bearing to the right. Follow the straight valley. The scenery becomes very picturesque, the little stream flowing through a marshy flat between well-marked cliffs. The road soon crosses the valley and begins to rise on the right bank of the stream above which stands the Château of Comarque built in the twelfth century. The Château is on a wooded hill commanding the valley, ivy has flung a mantle over its ruined walls, the narrow windows and sturdy keep show it was built in war-like times, and until treason delivered it into English hands this castle played an important part in the Hundred Years' War. Facing Comarque on the other side of the valley stands the Château of Laussel built in the fourteenth century, which, though perched like Comarque on the hill-side, is more of a dwelling-house, being built in a century when defence was not such an urgent need. The towers are crowned by pointed tiled roofs, and it is still used as a residence. After breasting the hill for a short time the road turns away from the river for a moment, following the contour of a little side valley, and at this point the cave of La Grèze lies a few hundred paces above the road downstream; and that of Cap Blanc about half-a-mile upstream below the road we continue to follow. The keys of both are to be obtained from the guardian living at one of the houses perched on the hill-side straight ahead. The cave of La

Grèze is a small chamber 7–8 yards long, and 5–6 yards wide, in which there was a deposit. On the cave walls, under this deposit, were several engravings, and one magnificent bison[1], which from its archaic style and the fact that it was covered by early archaeological deposits is seen to be of Aurignacian age. This bison is engraved low down near the floor level facing the entrance; and in the deposits that covered it some implements of Upper Solutrean age were found, and a great number of Lower Magdalenian tools[2].

Cap Blanc, the site of which has just been indicated, contains sculptures in high relief of Lower Magdalenian age, of horse[3], bison, and stag, all the animals following one another and thus forming a sort of frieze, now protected by a stone penthouse. The cave contained only one thick deposit of Lower Magdalenian age (M. 3), which covered the frieze, and in this deposit was found the skeleton of a Cro-Magnon man, whose remains are kept in the rock shelter[4].

Comarque. On the opposite side of the valley is the cave of Comarque, directly under the château of that name. The remains of prehistoric art, both engraving and bas-relief, are found in short galleries to the left, and in one to the right at the end of the vestibule, more especially in the gallery to the right. About half-way down the gallery (to the right on entering), six feet from the ground, is a magnificent bas-relief of a horse's head facing outwards[5], the rest of the body seems to be indicated by natural reliefs in a rocky wall. On the opposite wall are engravings of rhinoceros (?), and a bear; and elsewhere the figures of an ibex and horses.

Bernifal. If at the cross-roads in the Beune valley instead of taking the road up the valley to Laussel we had borne to the right up the main road, we should have followed the left side of the valley for a time, then crossing to the right bank near the rock shelter of Cazelles, which contained Magdalenian deposits, we should soon have reached the fortified farm house of Viel-Mouly. Here a guide can be obtained for visiting the cave of Bernifal.

The cave of Bernifal opens on the opposite side of the valley, the entrance being like a well, down which the explorer must descend by an iron ladder, the old entrance having

[1] See Plate IX, C.
[2] See Bibliography, Breuil, 1904.
[3] See Plate XIX, A.
[4] See Breuil, 1911.
[5] See Plate XIX, B.

been masked by some ancient land-slide. The chamber at the foot of the iron ladder ends in a passage some few feet in length, on the right-hand wall of which, and in the further chamber, there are tectiforms, and a large mammoth, and other engravings. They are all very shallow and difficult to see. In a further passage on the left, difficult of access, there is a magnificent engraving of a mammoth.

The poor engravings of a horse and hind at La Calévie, and a bison, and ibex at Nancy, and of a negative left hand in red at Beyssac, all in the Viel-Mouly district, and the cave of Tayac at Les Eyzies, are hardly worth the trouble of a visit.

Gorge d'Enfer. The valley of Gorge d'Enfer is a short smiling valley that lies between the cliffs of the Roc de Tayac and those of Laugerie Basse, on the far side of the Vézère from Les Eyzies. It is here, in a little rock shelter (on a lower level than the magnificent rock shelter higher up in the Gorge d'Enfer), that a salmon[1] in bas-relief is sculptured on the ceiling. The key to the grotto can be obtained from M. Peyrony.

THE PYRENEES DISTRICT.

The other main district in France where prehistoric rock engravings occur is the Pyrenees. These decorated caves are to be found on the lower slopes of the French side of the Pyrenees, from the Ariège valley on the east, to just south of Montréjeau on the west. The best centres for visiting those in the Ariège district are Tarascon-en-Ariège and Foix. From here the caves of Niaux, Bedeilhac, and Portel can be reached.

Niaux[2]. From Tarascon-en-Ariège the road leads up the side valley of the Vic-de-Sos which is a tributary of the Ariège. In a mile or so a forge is reached, and at that point leaving the road climb the hill-side on the left to a terrace of green turf where is the entrance to the cave. For a few yards the passage is narrow, but soon widens, becoming about the size of an ordinary railway tunnel. The going is quite easy, except at one point when passing some rocks fallen from the roof. The old Neolithic lake is passed (see chapter on Art, section on Authenticity), and then some way further on the first manifestations of art are reached in the

[1] See Plate XXV, D. [2] See Bibliography, Cartailhac and Breuil, 1908.

form of a panel of red signs. This occurs at a place where the route really bears to the right, though it appears to go straight on, and the punctuation may have given some description of the way, though this is of course pure hypothesis. A little further on big cross-roads are reached, and in the passage to the left which is short, the only sign of art is an engraving of an ox on the floor, the body being marked with three circles indicating wounds. If the right-hand road is taken, climbing over sandy heaps and past engraved fish and the faded painting of a bison, damaged by water percolation[1], the passage ends in an apse. This is decorated with a wonderful series of black paintings. There are bisons with arrows in their sides, horse and ibex[2], and at the end there is a natural crevice shaped rather like a full-face stag's head, and this had been noted by prehistoric Man who had painted in two horns in black, thus making the illusion more complete. In a corner on the floor on the right-hand side are the engravings of the two trout[3]. Returning towards the cross-roads on the right-hand side there is an alcove, ornamented with red punctuations, up to which the explorer has to scramble. Continuing the direction of the road first traversed beyond the cross-roads, we come on a bison rampant on the right-hand wall[4], the back of which is determined by the natural formation of the rock and a painted spot on the back may indicate a wound. There are also some punctuations, sometimes in the form of dotted circles with a central dot, and also some club-like signs. Further on there is a very fine engraving of a bison on the ground, three little natural cavities in the floor are indicated by arrows, and no doubt represent wounds[5]. On the wall to the right are some figures which may be meant for feathered arrows, and near the final lake where the roof comes down to the water there is a tectiform, and some poorly painted animals. Beyond the lake is a mass of rock fallen from the roof which shows some red punctuations at one point. These can only be reached by plunging through the water of the lake.

Bedeilhac. Taking the road from Tarascon-en-Ariège to Massat, the mountain of Soudour rises on the right-hand side; the cave of Bedeilhac opens at the foot, at the far end

[1] See chapter on "Art Preservation."
[2] See Plate XXII.
[3] See Plate XXI, C.
[4] See Plate XXI, D.
[5] See Plate XXI, B.

from Tarascon and on the far side of the hill from the road. At certain places there are some punctuations, and on the left-hand side a considerable distance from the entrance there is a bison painted in dark brown.

At the top of the Soudour, facing away from Tarascon in the direction of Massat, is the large opening of the cave of Pradières. It is difficult of access, and there is nothing of much interest except a series of irregularly distributed red points on the right-hand wall of a right-hand gallery.

Portel. Take the train from Foix to Baulau on the line to St Girons, and from Baulau the road going northwards away from the line, and following it for some distance till limestone rocks appear on the right-hand side, then bear to the left along the limestone ridge. After some distance the road makes an S curve. Then, avoiding turning to the left to Mas d'Azil, continue straight on to the farm of Portel on the top of the hill. The cave opening is 50 yards behind the farm in the hill-face; it is small and the passage drops very abruptly. On reaching a lower gallery the left-hand turning should be taken, as there is nothing to the right. This leads into a long corridor which eventually divides into two, and just before this bifurcation there is a short gallery to the right. On scrambling up on the left of the short gallery another long gallery containing the best paintings is discovered. Though the best paintings are to be found here, there is art in the main corridor and in both its two arms. The animals shown are reindeer, bisons, horses, and there are as well men, hands and tectiforms.

On the left-hand side of the left-hand spur of the main corridor, a Man is painted round a natural concretion of stalactite which is made to imitate the genital organs; and at the beginning of this spur near the level of the ground to the right is the small figure of a horse painted in red, recalling those at Cantos de la Visera of the Eastern Spanish style. On leaving the bifurcation and going towards the cave entrance, on the right-hand side there is an alcove in which are painted antlers, also recalling the Eastern Spanish style.

Mas d'Azil. If instead of striking upwards to Portel the main road from Baulau had been followed Mas d'Azil would

have been reached. This immense tunnel through the hills, traversed by both river and main road, has thick archaeological deposits, but only traces of paintings and engravings in the corridors that open on the right bank, which are not worth describing. The famous Azilian deposits are on the left bank of the river, at the entrance of the tunnel.

Tuc d'Audoubert. The next cave of interest going west is the Tuc d'Audoubert in the commune of Montesquieu-Avantès. *Tuc* in the local dialect means a crowning mass of rock. The cave mouth is found in a small valley and issuing from it is a subterranean river. In order to enter the explorer must take a boat for about 80 yards, then a scramble upwards will lead him into a large chamber hung with some of the most beautiful white stalactites that it is possible to imagine. In a corner of this room there is a short narrow passage containing some fine engravings of horse, reindeer, and bison. These are probably Magdalenian, and the occurrence of a Magdalenian deposit in the Tuc as well as the proximity to the cave of Enlène with its Magdalenian deposits containing decorated bones supports this theory. There is a chimney-like opening at one side of this chamber of the Tuc, the roof is reached by a ladder, and the chimney leads to a passage behind that is difficult to follow, there being considerable undulations. The passage becomes so narrow that the explorer has to go through lying quite flat, as if in a drainpipe. Here there are a few engravings of a more archaic type, representing a hind, a carnivor, a stallion, bisons, etc.; and near by, after passing some stalactite, which had to be broken by the first explorers on their entrance, there is some macaroni on the roof. The art of this gallery seems to be Aurignacian. The bottle-neck passage leads into a much larger gallery behind, and it is probable that this little passage has pierced its way into a larger cave the original entrance of which is blocked. The cave behind is perpetually damp and the floor is of clay. Here and there are the claw marks left by cave bear, and even the complete impression of a paw in the clay. When prehistoric Man came on the scene he broke some of the bones of the bear skeletons, and removed some of the teeth no doubt for decoration. In one case a small lower jaw, after having its

canine removed, had been poised on a piece of rock where it is now firmly fixed by stalagmite. In this part of the cave there are traces of naked human feet left in the clay; and a scraper, scraper-graver, utilised flaked flints, and an ox tooth, all of Magdalenian age, have come from near by. Lying against a rock in the middle of the passage, and almost at the end of the cave, are the statues in clay of two bisons, a male following a female[1]. The female measures 61 centimetres in length, and 29 centimetres from the hump to the belly; similar measurements of the male give 63 and 31 centimetres respectively. The sides of the animals leaning against the rock have not been completed, but only the surface face. Only the fortunate accident that this cave, though near the surface, is perpetually damp, and yet has no running water, has preserved these statues, and even as it is some extra dry season or some movement of the soil has cracked both bisons right across. Near by are two other figures sketched out in the clay of the floor; both are bisons, the one being 13 and the other 41 centimetres long. In the the second instance modelling had actually begun, the horn projecting. To the centre of the cave near the bisons there is a large semi-circular depression like a small Roman theatre, the sides of which have provided lumps of clay necessary for finishing the modelling. In the midst of this depression is a tiny hillock of clay, about one foot high, and round it are marks which might have been made by people jumping on their heels, there being no impression of the front part of the foot. On the floor of this semi-circular depression there is also a harpoon drawn with a finger. Whether or not there are other figures in this place we do not yet know, as the clay being still plastic, any exploration would destroy as it advanced, unless a very careful scaffolding of planks was introduced, and this, considering the difficulty of access, is wellnigh impossible[2].

Trois Frères. Near by the Tuc is the cave of Trois Frères, very difficult to explore and the result of which has not been fully published. It contains a host of engravings, amongst which is a lion's head which seems to guard the entrance to a little alcove; also birds rather like owls; human

[1] See Plate XXIV.

[2] See Bibliography, Begouen, 1912.

hands; punctuations; and a figure of a Man, disguised by the addition of stag's antlers on his head, and a tail[1]. This figure dominates an alcove where the main group of engravings occur. These comprise bison, rhinoceros, lion (full face), reindeer (galloping, lying down, etc.), mammoth, horse, bear, etc. The masked man is seen some twelve feet from the floor of the alcove and can be reached by traversing a natural tunnel and then mounting a natural fissure to the left, behind.

Marsoulas. Going still westward the next painted cave is that of Marsoulas, reached from Salies-du-Salat by crossing the river and continuing towards the village of Marsoulas. Before the village is reached some two miles from Salies, the road drops down into a little valley and crosses a stream, the first stream crossed after traversing the main river. The opening to the cave is half-way up the hill-side, opposite and a little to the left. The valley which it overlooks is well wooded, pleasant and peaceful, and the cave runs parallel with this valley and does not strike straight into the hill. It was probably much longer originally, but the front portion has fallen in, so that it is of no great length. The engravings and paintings are almost all on the left-hand wall. Towards the end the cave narrows considerably, there is art on both sides, and it rapidly drops to a little stream below. In this cave[2] we find a large engraving of a horse with head down and tongue out, the body filled in with transverse lines. Also a very fine, beautifully made engraving of the fore-quarters of a bison, and a palimpsest composed of a polychrome bison painted over the debris of older art, on which is painted a conventionalised hand, over which in turn is scratched the back and mane of a horse. Further on still are three bisons, two of them showing stippling on the body; one is painted in a naturally-rounded niche, the shape of which has determined the figure of the bison and given it a grotesquely circular contour. In the narrow part at the end of the passage there are half a dozen or more sketches of the human face. Besides these there are engraved ibex and stag, and painted tectiforms, and on a large part of the left-hand wall on entering there is a bright-red barbed line covering everything with which it comes in contact. This is the most

[1] See frontispiece.

[2] See Plate XX.

recent painting in the cave, and according to M. Breuil should be considered as Azilian. The deposits at the entrance which were dug by the Abbé Cau-Durban seem to have contained Aurignacian and Lower Magdalenian (M. 3) industries, the latter had needles and fine engravings, but no harpoons.

Tarté. On the same range of cliffs, but lower down the little valley, is the cave of Tarté which has no art but a rich Aurignacian industry. It was here that the keeled scrapers were first recognised as they occur in profusion, and for a time they were even called Tarté scrapers.

Gargas. The next cave (Gargas) can be best reached from the little village of Aventignan, a few miles out of Montréjeau. Turning one's steps from this village in the direction of St Bertrand de Comminges various gravel terraces of the Garonne are passed, which are due to the different glaciations of the Ice Age, and border a small tributary stream. A spur of limestone hills juts out into the Garonne valley, and near the top of this is the cave of Gargas. There are really two caves, originally separated but now connected by a passage, opened by the guardian of the place for the convenience of visitors who wish to see both. The walls of the little one, known as the second cave of Gargas, have been much corroded by weathering, there are no traces of cave bear scratchings, and only a few traces of art which seem to fall into line with the ordinary Magdalenian frescoes[1]. The main cave, which contained the deposits, was, as has already been shown, blocked up before Magdalenian times, the art was therefore earlier. The walls in various places show a large number of human hands, the majority being left hands; the proportion of left to right hands is much larger on the left-hand side of the cave than on the right; there being actually a few more right hands than left on the right-hand side of the entrance chamber. The hands are negative, the colour being sometimes red and sometimes black, they are often mutilated, there being some examples from which one or more joints of the fingers have been removed[2]. Attempts have been made to produce similar designs by doubling the fingers, placing the hand on

[1] See Bibliography, Breuil, 1913. [2] See Plate XVII, A.

the cave wall and applying the colour, but no good result has been obtained, and it is very doubtful if this is the explanation. Certain modern primitive people remove some of the joints of their fingers to appease evil influences. Are we to recognise in these mutilated hands at Gargas an earlier form of this magic amongst the Aurignacian people?

Two localities in the Ardèche valley where painted caves occur, Chabot and Figuier, are of no great importance except for their geographical position, and have been sufficiently treated of in the chapter on General Distribution.

CHAPTER XIX

DISTRIBUTION OF ART IN NORTH SPAIN

The caves containing Palaeolithic art, with few exceptions, occur north of the Cordillera Cantabrica, which is a continuation of the Pyrenees into North Spain. The few exceptions, such as Cueva de Penches, and La Pileta, have been treated of in the chapter on Distribution. Besides these there is the Eastern Spanish school, which is usually found classed as Palaeolithic, and this school will be treated of in a separate chapter. Besides these few exceptions and the Eastern Spanish group all the Palaeolithic art is centred in the north. With the exception of a locality which has not yet been published, the most easterly occurrence is on the eastern border of Cantabria in the pass of Carranza. The railway after leaving Bilbao rises and crosses a rather dull plateau and then plunges through some low hills into Cantabria, the line following the right-hand bank of the river Carranza. From either side of the river the rocks rise steeply, crowned by trees, and the road, the railway, and the river divide the width of the gorge between them. Above rise the slopes, in some cases covered with heather and topped by limestone hills pierced with caves. Behind the little farm called Venta de la Perra are three openings leading to short caves, and in one of these are the first manifestations of art. There is a bear deeply engraved, the very fine back of a bison, and two other figures, one of which may represent an ox. There are also some other incisions on rocks to the right of the vestibule which have been compared to some on rocks in the Forest of Fontainebleau, though the latter are probably of more recent date.

Following downstream the next cave is that of Sotarriza, which is on the opposite side of the river near the top of a small hillock. It is of but little interest as there is only one black painted horse, poorly executed, at the end of one of its two galleries.

We then travel down to the station of Gibaja, and from

there leaving the river and going southwards up a tributary stream reach the little hamlet of Ramales, and thence to the head of the valley which ends in a sort of amphitheatre. To the right rises the imposing triangular peak of San Vicente; to the left in the limestone hill-side opens the little cave of La Haza, containing paintings of horses and a carnivor which are not of much importance. At the head of the valley on the left-hand side is the large opening of the cave of Miron. There is a Palaeolithic deposit in the vestibule, but no art in the cave, which is possibly due to the intense weathering. Scrambling up the side as high as the cornice, an opening into a cave immediately above is discovered. This is the cave of Covalanas which contains a series of paintings in the punctuation style, each punctuation being possibly made with a stamp. These paintings mainly consist of seventeen hinds, one of which is turning its head; in some paintings all four legs are indicated, and in others only two. With these there is a horse, some simple tectiforms, an ox and the head of an ox, which from their graceful form probably denote *Bos primigenius*. There is no trace of engraving in conjunction with the paintings. The view from the cornice looking down the valley to the peak of San Vincente is superb. The valley with its meandering white roads and streams lies below, and the cave is a natural stronghold, the only entrance being along the cornice which forms a rock bridge, and therefore it must have been particularly easy to defend. From Gibaja to the regions round Santander there is no art, except for one place of not much interest, a good way south of the railway line, the cave of Salitré, which contains some poor figures in black.

On taking the train from Santander to Puente Viesgo and following up the Rio Pas we reach a pleasant valley. The conical hill of Castillo rises above the village, and the cave of Castillo looks down on the valley in which lies the village of Puente Viesgo. The river and the road join, separate, and approach again, as if swayed by the natural laws of attraction. The country-side resembles parts of Derbyshire with the valleys full of lush grass out of which white limestone mountains arise. Near by at Puente Viesgo are some hot springs used to-day by the bourgeois of

Santander as a watering place. Very likely in Palaeolithic times the animals came to bathe here and would be an easy prey to the men, who for that reason lived continuously on the hill overlooking the valley. Probably it is due to the presence of these hot springs that we have here to-day the most complete archaeological section known. The whole country is fascinating to a geologist as a big reversed overthrow fault has completely inverted the beds of strata for a distance of a quarter of a mile. The main massif behind the village is of Jurassic limestone, but the conical hill of Castillo is carboniferous limestone.

Two extensive and important caves are situated in this hill at about the same altitude, and are decorated with paintings and engravings. The cave of Castillo in full view of Puente Viesgo looks over the valley; and the other cave of Pasiega is half a mile further on, and looks up the valley across a side valley. It was in the vestibule of the cave of Castillo that the extensive diggings made by the Institute of Human Palaeontology under the auspices of the Prince of Monaco brought to light some twenty-five layers, twelve of which contain archaeological remains of different ages. These diggings were directed by Dr Obermaier, and occupied fourteen workmen for several seasons. In the cave behind the vestibule there are a great profusion of paintings and engravings[1], there are horses, bisons, hinds, tectiforms and a frieze of human hands, an elephant, chamois, ibex, human figures, etc. The cave is large and complicated, and a competent guide knowing where the art occurs is necessary. All the phases of art are represented, and we can closely compare the hinds of phase 2, in the style peculiar to Cantabria, with those engraved on bones of exactly the same style found in the Lower Magdalenian (M. 3) deposit in the vestibule.

The cave of Pasiega is still more complicated, and is a real labyrinth. It opens in a small rock shelter from which the explorer descends a well about six feet deep, a low winding passage leading thence to a vestibule from which branch passages in all directions. Taking one of these passages to the left, after a considerable scramble, a small chamber is reached. At one end is a sort of stone throne partly

[1] See Plates X, XI, XVIII, XXVI, XXXIX.

natural, partly artificial. On the seat when the first explorers, Dr Obermaier and Paul Wernert, arrived there was a rough disc-like implement made of limestone of distinctly human manufacture. Just to the left of the throne is a very fine engraving of a bison, probably of Aurignacian age. Besides this there are paintings of bisons, hinds, a figure in bichrome (the colours dating from different ages), a human figure indistinct except for the hand and arm, tectiforms, etc.

Returning to the vestibule and taking a corridor on the opposite side, one reaches another gallery, arriving at what was probably the ancient entrance to the cave. Here there are a group of tectiforms forming a kind of symbolic inscription. There is an E, but with a double bar in the centre of the letter: E. To the left of these are one or two punctuations and bars, and above are two designs of human feet, one with four toes and the other with five. Still more to the left is a complicated design[1] looking rather like a boat with a central mast, and double masts at both prow and stern. Between these three groups of masts are two sets of two U-shaped signs, one above the other. The word "boat" is only used to describe the shape of the design, there is no suggestion that it had anything to do with a boat.

Elsewhere in this gallery amongst other things there are two very fine engravings of horses, somewhat similar in style to the fine engraving of hinds in the Cantabrian region typical of the second phase[2].

Passing by this gallery the main gallery of the cave is reached, which contains a quantity of paintings mostly in red. There are hinds, one turning its head[3], horses, stag, ox, ibex, and chamois[4]. The paintings in this cave fall into eight series, mainly determined by their super-position.

(Earliest) 1. A human hand and a small conventionalised human figure.

2. Figures in simple line tracings.

3. Figures in which the down stroke is thickened.

4. Figures traced in punctuation becoming more and more "splash" style.

5. "Splash" style (i.e. outlines daubed in).

6. Beginnings of flat-wash.

7. Flat-wash.

[1] See Plate XXVI, 13.
[2] See Plate XI, C.
[3] See Plate XIV, A.
[4] See Plate X, C.

8. Bichromes produced by restoring an animal painted in one colour in another.

The majority of the paintings at Pasiega are either Aurignacian or Early Magdalenian, and it is one of the most important places known for studying the early development of the painted art. Though as has been said most of the paintings are in red, a few are in black, and there are some engravings[1].

Following the valley below the cave of Pasiega, round the hill of Castillo, turning away from the Rio Pas, the road leads you to San Felice de Buelna. Before reaching this, at the hamlet of Tarriba, a little road to the left, ending in a path, brings one at last to a sort of amphitheatre. On the left-hand side half-way up there opens the cave of Hornos de la Peña.

There is a large vestibule fully lit by day, the opening being towards the south. Only two decipherable engravings are to be found in this vestibule, the one on the right a poorly preserved headless bison, and the one on the left a vigorous deeply-engraved horse[2], there are also traces remaining of other engravings. Behind this vestibule a narrow passage is entered leading to a large cave composed of a number of galleries.

If Pasiega is important for the study of early paintings, Hornos is the place *par excellence* for the study of engravings. There are examples of the wandering lines called macaroni[3], and of primitive drawings of animals such as could be traced with a finger, being in complete silhouette except for the horns which are represented as full face. Also simple line engravings of the beginning of the first phase occur, with only two legs and generally without the indication of an eye; till we reach the well-made and vigorous bison[4] and horse at the end of the first phase (that is at the end of Aurignacian times), the very acme of Aurignacian art. All four legs are indicated, and the eye is still almond-shaped instead of being round, the round eye being a trait very characteristic of Magdalenian times. There is also a figure of a Man with a tail in this early Aurignacian art.

Finally the cave shows a small series of early Magdalenian

[1] See Bibliography, Breuil, 1913.
[2] See Plate IX, A.
[3] See Plate X, A.
[4] See Plate IX, E.

engravings comprising horse, bison, and ox. The outline is no longer drawn with one firm line, but is sometimes represented by a series of short upright strokes. Only faint vestiges of painting remain in one or two places.

The sequence in age has as usual been obtained by a consideration of the super-position of the various engravings seen in the cave.

Another cave containing paintings of a certain interest is that of Santian, near Puente Arce, a little village nearly ten miles from Santander. Taking the road from Puente Arce to Escovedo a low range of limestone hills is approached, and on the left-hand side stands the small castle of Santian, built in the seventeenth century. Half a mile beyond this castle, in a little amphitheatre in the limestone hills, is the cave of Santian. The road actually passes over it, and to find the entrance one must scramble down on the right-hand side. The cave consists of a single long winding gallery, and the paintings are grouped in one place. They are fifteen in number, and consist of conventionalised hands and arms[1], the number of fingers is variable, and in one case the hand is reduced to a sort of trident. They are all painted in red, and whether or no all or any were meant by prehistoric Man to represent human hands is of course largely a question of hypothesis. They have been compared in form with some Australian implements and paintings, and with certain Eskimo implements used for scraping or grappling. As all other representations of the human hand are found to be of the earliest, and therefore Aurignacian, age, these are also assigned by analogy to that period.

The next cave, that of El Pendo, is reached by continuing the road past Santian to the village of Escovedo, and thence (leaving the village on the left) to the cross-roads, where there is a simple inn. Thence by a path a mile further to a small oratory consecrated to San Pantaléon, and again a mile beyond the oratory to a country full of natural punch-bowls, behind which is a hard limestone ridge. From a treeless plateau on the top of this limestone ridge, the immense opening of the cave of El Pendo is seen. The river which formed this cave now disappears underground before reaching it, and the cave itself slopes steeply down, finally

[1] See Plate XVII, C, D.

degenerating into a mere crack. Penetrating into this crack for some distance a panel engraved with two birds[1] is seen on the right-hand side; these have been already described. The main cave contains archaeological deposits still imperfectly excavated, they are probably of Solutrean, Magdalenian, and (if the number of shell-fish is any test) of Azilian age.

The cave of Altamira is best reached from Santander, the railway goes to the little town of Torrelavega, whence Santillana del Mar is reached by road (2½ miles or so). From the *fonda*, overhung by a large tree, the guide leads the traveller up on to the downs, overlooking Santillana del Mar of *Gil Blas* fame. The little path follows the grass covered undulations of the downs with their crater-like depressions or *dolines* due to subterranean solution of the limestone. It is near one of these that the entrance to the cave of Altamira is to be found, an entrance closed at present by an iron gate which opens on to a vestibule partly filled with blocks of limestone fallen from the roof. On the left is a modern wall built to protect the paintings from the condensation and re-evaporation of moisture, as, after the entrance to the cave was opened and enlarged about fifty years ago, the paintings were in danger of destruction from this cause. Behind the heap of rubbish fallen from the roof in front of the entrance is a long gallery containing paintings and engravings. To the left is a chamber, and here the roof is so low that a normally sized man cannot stand upright. It was here about fifty years ago that a Spanish gentleman, Don Marcelino de Sautuola, came to search for prehistoric remains. He happened to bring his daughter with him, who being very young and small was able to stand upright. Getting tired of watching her father she wandered about, and noticed on the ceiling what she took for paintings of bulls. Thus was the famous frescoed ceiling discovered. We may note that the authenticity of these paintings was denied, until certain proof of the age of the cave art was discovered in the cave of La Mouthe. The animals are extraordinarily well painted, mostly in polychrome, many of them being more than five feet long. One thing the visitor notices, and that is that each animal seems to have real individuality, they are by no means conventional types. From the ceiling

[1] See Plate XVIII, B.

hang several natural bosses of stalactite resembling a round pillow in shape, and round some of these prehistoric Man painted bison, the shape giving a sort of natural relief to the animal, and producing a very vivid impression of bisons curled up. On the ceiling there are also many other older manifestations of art, amongst them shallow surface engravings representing human figures whose heads seem to wear the masks of animals, and whose hands are sometimes raised in supplication. In some cases the male genital organ is indicated. There are also excellent engravings of stag and hind in the Cantabrian style, which has already been described at Castillo. The art at Altamira[1] is however by no means confined to the well-known ceiling fresco, all along the gallery behind are examples of Palaeolithic art, this painting being of a much more primitive type though the engravings are less so. In a narrow fissure there is a succession of tectiforms arranged in a sort of frieze. The choosing of narrow fissures in which to paint tectiforms is a common occurrence. The cave also contains the scratches made by bears sharpening their claws, and on a cascade of stalagmite there is the deep vigorous engraving of the back of a horse. The animals figured consist of bison, stag, hind, horse, pig, wolf, ibex, chamois, ox, elk (poor), tectiforms of various types, and men. It is a place of mystery and wonder, while the frescoed ceiling itself makes the traveller feel that though primitive this early folk had at least an art as skilful as our own, denoting a real civilisation though still devoid of such aids as bombs and 17-inch shells!

Taking the train from Torrelavega on the Cabezo line the station of Santa Isabel is reached. Not far beyond the station, in the steep hill-side on the left, is the cave of La Clotilde. The only animals figured here are some representations of bulls, and possibly a lion's head. They are poorly executed in outline by a finger tracing in clay, the legs are roughly drawn, there are no hoofs, the bodies are filled in with thick vertical strokes. This cave has always been open, there are no deposits, and the only way of dating is by means of analogy with those figures of similar style drawn at Hornos de la Peña.

[1] See Plates XII, XIV, XVI, XVIII, XX, XXVII.

The caves of Novales and Meaza that are in this area may be omitted as they do not contain anything of very great interest, but further west on the line from Santander to Oviedo is the cave of La Loja. This is reached from the station of Unquera by the road going towards the Picos de Europa, to the village of Potes up the valley of the Deva. After passing the village of Panes the defiles of Hermida are approached, and at one place some ten miles before reaching the defiles, where the mountains recede a little, there is a small cultivated meadow. The cave of La Loja is in the limestone wall on the northern side, the road passing through the rock wall. This cave contains engravings almost exclusively of bulls, there being but one exception, viz. the figure of an indeterminate animal rather more resembling a carnivore than a bull. The engravings are found some little way into the cave engraved on a flat surface high above the present level of the soil. They are probably of the third phase, i.e. of Magdalenian age.

Beyond Unquera towards Oviedo is the station of Colombres, from which the little village of Pimiango is a mile and a half distant. From there the cliffs overlooking the Bay of Biscay can be reached in a short walk; on reaching the sea a lighthouse will be seen, and a little to the east of this a narrow valley with precipitous sides slopes downwards to the sea. In this valley is the cave of Pindal. From the entrance one's eye travels over the green turf to the jumbled mass of broken rock down which one has to scramble to reach the sea. The cliff walls rise steeply on either side of the green sward in front of the entrance, and beyond the turf and the rocks, the eye rests on a great pillar of limestone at the foot of which the waves are churned into white foam. Outside the little bay is the wide stretch of ocean, and the cave echoes perpetually the lament of the baffled waves dashing against the cliffs. This cave is specially interesting for the engraving of a fish[1], and the painting of an elephant (not a mammoth). The following series of decorations have been discovered:

1. (The oldest) Delicate line drawings in red, such as the horse to the left and an elephant.
2. Pictures in shaded black.
3. Daubed or splashed outlines. The hind in this style

[1] See Plate XVIII, D.

is partially engraved, and so is the bison, this occurs at Altamira before the "flat-wash" era, but they belong in all probability to the third phase.

4. Polychromes (early). The fine engraving of a fish described in the chapter on animals is of this age. There are some finely made punctuations placed near one of the polychrome bisons; these may be of this age though some are older as the fish is engraved over three of them. There are also some club-like signs at Pindal recalling those at Niaux in the Pyrenees, and at Altamira.

From Colombres the railway goes to Llanes passing the station of Vidiago, from which Peña Tú with its Neolithic or Eneolithic paintings can be seen some two miles away on the hill-top to the left.

One and half miles to the east of Llanes is the cave of Bolao near the village of that name. The general ground plan of the cave of Bolao is in the form of a T, and at the end of one of the arms on the low arched ceiling near a spring of water is a group of red painted tectiforms. This is the only art represented in the cave, but is of some interest owing to the fact that in this case at any rate, we seem to have some connection between a permanent source of cool water and tectiform signs. The signs are of a very simple order, some of them being ladder-shaped, others clusters of alternately waved and straight lines[1].

In more or less the same area are three caves, Quintanal, Mazaculos, and San Antonio (Riba de Sella). These three do not contain anything of very real interest, but there is one of very considerable interest called Caverna de la Peña, de Candamo (Asturias), which contains art of Aurignacian and Magdalenian age with a specially fine series of horses.

The most westerly occurrence of Palaeolithic art is at the Cueva del Buxu. To reach this cave the explorer must find his way to Soto de Cangas, which is reached *viâ* Las Arriondas. From there retrace your steps about five hundred yards in the direction of Cangas de Onis which will bring you to the mill of Teleñes. From there a path leads to the river Güeña, which is crossed by a suspension bridge. On the far bank take the right-hand road going to the hamlet

[1] See Breuil, 1913.

Cave	Hands	Horse	Bison	Ox	Ibex	Hind	Stag	Lion	Elephant	Bear	Boar
Altamira ...	3	25	35	7	11	40	16	—	—	—	3
Castillo ...	35 left 9 right	24	24	13	12	37	19	—	1	—	—
Hornos ...	—	12	11	5	4	—	1	—	—	—	—
Pindal ...	—	5	7	—	—	1	1	—	1	—	—
Covalanas ...	—	1	—	1	—	17	—	—	—	—	—
La Haza ...	—	5	—	—	—	1	—	—	—	—	—
Venta de la Perra ...	—	—	3	1	—	—	—	—	—	1	—
La Clotilde	—	—	—	7	—	—	—	1	—	—	—
La Loja ...	—	—	—	—	5	—	—	—	—	—	—
El Pendo ...	—	—	—	—	—	—	—	—	—	—	—
Santian ...	15	—	—	—	—	—	—	—	—	—	—
Pasiega ...	1	40	21	13	6	34	12	—	1	—	—

Cave	Humans	Fish	Birds	Carnivora	Chamois
Altamira	10	—	—	—	1
Castillo	2	—	—	—	3
Hornos	1	—	—	—	—
Pindal	—	1	—	—	—
Covalanas	—	—	—	—	—
La Haza	—	—	—	2	—
Venta de la Perra...	—	—	—	—	—
La Clotilde ...	—	—	—	—	—
La Loja	—	—	—	1?	—
El Pendo	—	—	3	—	—
Santian	—	—	—	—	—
Pasiega	1	—	—	1	2

This only includes well drawn, easily determined figures.

of Cares, but before reaching this village the road divides and the left-hand branch must be followed. Further on a rock rises on the right, 25 yards above the level of the river, and on the slopes of the hill a few yards up is the entrance to the cave of Buxu, hidden from sight by a thicket and a chesnut tree growing in front of the opening. Climb the steep slope, struggle through the brushwood, and you will find the mouth of the cave. It consists of a vestibule with several galleries, containing Palaeolithic engravings and paintings. These are of a primitive type and consist of horse, stag, ibex, and tectiforms, one of which is of a complicated type. There is also a bison important from the point of view of the age of this art.

The art is divided into three groups:

1. Engravings almost always incomplete in outline of a very rudimentary kind. The animals figured include horse and ibex.

2. Outlined figures well executed and details indicated. There are engravings of horse and stag, and paintings of stag belonging to this group.

3. Figures well-made, not in single line outline, sometimes the silhouette is shaded by several strokes, details are carefully given, and the body is often covered with shaded lines. Painting and engraving are frequently associated, and there are horses, stags, bisons, and deer belonging to this period. This third group by comparison with the other caves might be classed as Middle Magdalenian (phase 3); the others being Lower Magdalenian or even Aurignacian from their general appearance[1].

[1] See Obermaier, 1918.

CHAPTER XX

EASTERN SPANISH ART[1]

UNDER the heading of Distribution mention has been made of the occurrence of a group of naturalistic paintings on the walls of rock shelters that are found more or less along the east side of Spain. It is proposed to devote this chapter to a study of this isolated and interesting school. Though the paintings and engravings in this group are naturalistic they differ considerably from the true northern Palaeolithic art in style. Human figures are frequently represented, being often, though not always, conventionalised, and bows and arrows are frequently indicated in the hunter's hands. The paintings in the Eastern Spanish style are not found in deep caves, but under overhanging rocks in shallow rock shelters; there are hardly any archaeological remains in the deposits of the shelters, and there is no *art mobilier*. A word or two on the preservation or destruction of paintings in these shelters may not be out of place.

The chance of destruction from various causes is of course very much greater in the case of paintings which are in full daylight, and not protected in the depths of caves. There are two main agents of destruction:

First—Weathering.

Second—Growths of mosses and lichens.

1. The destruction by weathering is either due to frost action, or rain, or sand blown by the wind or else by the condensation and re-evaporation of moisture due to changes of temperature. It is evident that none of these destructive agents acts in deep caves, where the only destruction is caused by water which percolates the porous limestone or sandstone through minute cracks that may by ill chance cause it to ooze at the point in the cave where the painting or engraving occurs. This may lead to the formation of a thick deposit of stalactite in the case of limestone obliterating the painting, or to the actual removal of the painting by solution of the outer surface of the wall at that point; but it is only an

[1] See Plates XXXIV, XXXV.

evil chance that brings a serious oozing of water where the painting happens to be. The temperature remains uniform, therefore striking cool in summer, and warm in winter to the explorer coming from the outer air. There is no frost action, and except close to the entrance no condensation and re-evaporation of water vapour. The depth in a cave to which this condensation reaches depends on the size of the opening and its aspect. We thus see that paintings in rock shelters run more risk of destruction than those found in the depths of caves.

2. Unlike the cave drawings they are likely to be destroyed by other agents, i.e. lichens and mosses. These play a great part in the destruction of the drawings by holding moisture containing carbonic acid in solution, and thereby disintegrating the surface of the rock. Lichens and mosses can, however, only grow in places where moisture and light can easily penetrate, they are therefore not found on the back walls of rock shelters of any depth where moisture from rain, etc., does not penetrate. This is the reason that the back walls of protected rock shelters are generally yellow-red, as the atmospheric moisture is enough to oxidise the small amount of iron which always occurs in limestone or sandstone, there being no lichens or mosses to cover the rain-protected surfaces. It should be noted that the grey colour of limestone rocks and cliffs is largely due not to the colour of the rock, but to the cover of grey lichen which grows over them. The variety of rock has much to do with the preservation of paintings in a rock shelter. Those that are found on limestone or sandstone are naturally liable to a larger degree of destruction by the agents already enumerated, than are those found on harder rocks.

For example, certain Neolithic or later drawings are found near a place called Lubrin, in the Sierra Nevada in South Spain; and there are also some at Hindhammeren in Norway, on hard gneissic rocks that are scarcely protected at all from moisture and weathering, but the hard nature of the rock has defied all efforts of climate to disintegrate the surface, and neither mosses nor lichens can grow on a surface where there are no small cracks to enable them to get a hold of the rock face.

It is by no means correct to say that the rock shelters

containing paintings in the Eastern Spanish style always face away from the quarter of the prevailing wet winds, they are to be found facing in all directions. They are only found however on the east side of Spain, which is a fairly dry, frost free area, no trace of any have been discovered in the centre or west, the furthest extension of their distribution westward being under 80 miles from the Mediterranean. It is not proposed to discuss in any great detail all the various rock shelters where paintings of this series occur, but a certain number of the more important localities may well be mentioned.

The most northerly is that found on the wall and roof of a large block of rock hollowed on its under surface that occurs close to the little village of Cogul. In order to reach it the explorer has to take the train to Lérida, on the line from Saragossa to Barcelona, and thence drive over more or less pathless plains about twelve miles southwards in a "tartana," a two-wheeled springless vehicle, till he reaches the village of Cogul built on the side of the little stream called the Rio Set. The inhabitants are quite aware of the existence of the paintings, but happily, as is also the case for other Spanish rock shelters, the peasants think little of them, being satisfied that they were made by the Moors. A few hundred yards to the right of the paintings were found the remains of a series of tombs of unknown age hewn to a considerable depth in a horizontal sheet of rock. It is not suggested that these are of the same age as the paintings, they may be far more modern. They do not resemble those of Neolithic (?) age from the Laguna de la Janda district (see Spanish third group).

The painted surface measures about two yards long in this rock shelter of Cogul, the left half is executed on a nearly vertical wall, the right half extending over a projection and on to the roof. Some of the figures are hardly visible and very indistinct. At the top there are two conventionalised hunting scenes; half-way up on the right some little animals usually in red. At the bottom to the left, are three bulls in conjunction with clothed human figures. To the right of this is the so-called "dance of women round a man." This scene has been considered as definitely phallic, though the actual position of the man does not exactly

sustain this interpretation. The women figures suggest anatomically a negroid element. One of the hunting scenes above, which has already been referred to, is very conventionalised and probably of more recent date (Spanish third group), the other scene is naturalistic (Spanish second group), and is composed of a man holding a sheaf of arrows facing an animal, the latter being to-day very indistinct. M. Breuil claims strongly that this animal is a bison. The writer when he visited the spot some years ago, saw nothing to disagree with in this interpretation, but has to admit that the painting is far from being as clear as could be wished. Unlike the bisons of the true northern Palaeolithic group the hump is not indicated by a great arched swelling on the back, but rather by a slight curve.

Further south a series of rock shelters occur in the *barranco* of Valltorta, in the province of Castellón, which have been described by Dr Obermaier and his pupil, Paul Wernert. The paintings are exceedingly interesting and represent hunting scenes, etc. The human figure is often represented as if the man had been pulled out lengthwise, and he is armed with a bow and arrow. There really is an extraordinary likeness to Bushmen paintings, and the chance ethnologist who is shown the pictures without being told where they come from, at once remarks that they were made by this people. This group of drawings is situated about six or seven miles from Albocacer, which is itself 140 kilometres as the crow flies from Cogul, and between these two localities is the rock shelter of Cretas, or Calapata, which contains some very well painted naturalistic stags in the same style.

Another group is found not far from Teruel, a small town situated in the valley cutting inland through the mountains, and debouching on the coast at Seguntum, north of Valencia. In order to reach the paintings on leaving Teruel a road is taken up a side valley to the little town of Albarracin. This town is situated in a region sparsely inhabited by men and animals and with little vegetation except in close proximity to water. The drawings are found at three sites about three miles from the town, the rocks are reddish in colour, and the two main groups represent a series of bulls, associated with conventionalised men, carrying bows

and arrows. Leaving the picturesque old town of Albarracin huddled inside its walls, and guarded by many watchtowers the rounded outlines of which cut the blue sky, the explorer has a walk of about three miles before reaching the painted rock shelters. Looking back on the town from the far side of a narrow gorge, the houses resemble a flock of frightened sheep, they are so crushed together, and two square church towers, each crowned by a cupola, look down on the clustered roofs. In the gorge below the land is cultivated, a square of garden is spread like a carpet before the little *fonda*, and the washing is bleaching in the sun on the terraced slopes, but turning one's back on the battlemented wall that climbs the hill the way lies over sandstone rocks of triassic age. The country is drear and barren, and following the route by the *barranco* the path is soon lost in the rocky bed of the stream, and one stumbles along over boulders and rubbish. Higher up the valley is wider and the slopes more gentle, and at last a little pine wood is reached which boldly climbs the limestone terraces full of grottoes, that have been formed by natural erosion. A little cluster of trees conceals the entrance to one of these grottoes or rock shelters, called the rock shelter of the Little Bulls.

It is not till the afternoon, when the sun is striking into the shallow cave, that the paintings can be seen really well. A frieze of wild bulls runs round the walls. Most of the animals are painted in dirty white on the dark red walls, whilst the centre of the body is filled in with dull rose. In one instance the bull is painted in black, while in another case where only the body is distinguishable the painting is done in yellow ochre. In one example the hoof has been picked out carefully in black, and all the animals bear traces of polychrome. They are arranged in no particular sequence, though in almost all cases the heads are raised, and the attitude alert. The bulls are in silhouette, one roaring, one walking, the others stationary; and they are very well drawn, much attention being paid to detail. The horns are curved, and in some cases the ears are indicated just below the roots of the horns; as a rule the eyes are not reproduced, but when clearly drawn the cloven hoof is shown.

There is another rock shelter distant less than a mile

from the first. This second is difficult of access, being situated up on a cliff, and it means a stiff scramble to reach it. Here the bulls are accompanied by conventionalised human figures, two of the latter are painted in black, and three in white. Two of the white figures are unarmed, the third which is badly represented has a very big bow and an arrow pointing downwards. There is a black archer with three arrows drawing his bow at the animals on the left-hand side. Although the bulls of Albarracin resemble those of Cogul, they, unlike the latter, bear no traces of restoration. They are painted in clear tones, are of slightly different dates, and some have reached a rare degree of perfection in technique. The third site is a slightly overhanging rock on the left bank of the *barranco* itself. High up is seen the deep engraving of a horse not unlike those engraved in the caverns of the northern group. It has an erect mane.

A few small flint flakes of indeterminate age have been found near the first painted rock shelter; this is the only trace of prehistoric life which we have in this region.

Another district where this Eastern Spanish style occurs is in the province of Albacete. The rock shelter of Alpera, near the village of that name, looks over the plain bounded on three sides by Chinchilla, Alpera, and the hill on which is to be found the remains of the old Iberian town of Meca. There are several rock shelters, the nearest to the village of Alpera being the Cueva de la Vieja, and the Cueva del Queso. The first was always known to the natives; the second, thirty metres higher, was discovered by M. Breuil. Both are entirely covered with paintings of animals, men, and signs. Of 160 figures 130 are in the cave of la Vieja. There are 10 men, 26 stags, 4 bulls, 1 horse, 30 goats or ibex, 7 wolves or canines, 1 elk, 2 deer, and 17 signs well drawn.

At one point there is the picture of a man kneeling on the ground, armed with a bow[1] and arrow, who is preparing to shoot at a stag facing him. Not only is the stag unmoved, but it has even put out its tongue at him. Higher up we have another group, where the arrow has flown, and the stag

[1] The bows it may be noted are often shaped like a curly bracket. This has been compared with similarly-shaped bows figured in Egyptian pre-dynastic art.

transfixed is walking sorrowfully away. There are three distinct colours, the oldest paintings are pale red, the majority are in dark brownish red and are frequently painted over the pale red ones, whilst the bright red or orange of the conventionalised types (Spanish third group) are fresher, and when in super-position occur always on the other two series. The most important fact is the presence of numerous human figures. Only three feminine figures are noticeable, two are dressed, the third naked, and they all have wasp waists. The men are usually naked except for rings on their legs and feet, and they wear head-dresses, feathers or ornaments on their heads. Most are armed with bows and arrows; their attitudes are varied, they run, kneel, dance, or are seated. The paintings belong perhaps to the Magdalenian epoch, though they appear to be the work of a different race to that of southern France or Cantabria.

Hard by the main rock shelter at Alpera is another rock shelter called El Queso, which is important because amongst the animals depicted an elk is clearly recognisable. Near at hand too is the rock shelter of Tortosilla (Valencia), containing the figure of a man lacking his right foot, armed with bow and arrow, facing a kneeling chamois, known as such from the position and shape of its horns. The style in these last grottoes is exactly similar to that in the main rock shelter at Alpera.

In a rock shelter, the Cueva Negra, on the other side of the valley close to the slopes of a hill crowned by the old Iberian fortress of Meca, are the remains of paintings of Eastern Spanish style, and a little excavation at the foot produced a few flints, one of which was a very excellent Tardenoisean flake, probably referable to the Upper Palaeolithic or Upper Capsian culture of this part of the Iberian peninsula.

From Alpera can be seen, on the horizon, the steep rocky mass of El Arabi, which lies north of the small town of Yecla. The country is desolate, sparsely populated, burnt by a pitiless sun beating down on limestone rocks, and yet a country of many mysteries, hiding many secrets. In their efforts to find suitable stone to build a dam, and store some precious water near their village, some peasants found amidst blocks of stone, remnants of a long forgotten city,

and strange statues of women in heavy hanging robes, and men in antique draperies. These are outside the period we are dealing with, being of much later (Iberian) age. There are no ruins of a great temple, but a wide sad plain stretches away till one's eyes rest on the grey mass of El Arabi, where there are many caves. At the south end is the rock shelter of Mediodia, containing paintings of the Spanish third group, discovered by M. Marino Serrano, as well as many caves and shelters without ornamentation. Searching for the cave of the Mediodia, the writer chanced upon two painted rock shelters which had escaped previous notice. They occur in blocks fallen down the slopes from the mountain, and hollowed by natural processes to form shelters on the under side. These rocks were already known locally as the Rocks of the Vizor (Cantos de la Visera), on account of the appearance of one of them, the overhanging part of which suggested the vizor of a helmet. All around these rocks the soil is littered with splintered flint blades, and a shallow digging at the foot of the principal rock revealed a thin layer of blackish hearths, containing a number of characteristically late Palaeolithic Capsian flints. The flint implements found here consisted of little cores, some of them only three centimetres long, a fragment of a rather stronger blade, trimmed on the upper face, and recalling slightly the Solutrean "willow-leaf" style, three flints with a one-side trimming, forming them into a type of side-scrapers, several large flakes, half side-scrapers, half end-scrapers, and several very worn end-scrapers. The only fragments of pottery found were of a very primitive character, and were only obtained from the top layer. The flint industry belongs undoubtedly to the Upper Palaeolithic or the Upper Capsian culture of the Iberian peninsula.

Not only are there paintings in the Eastern Spanish style, but some of the Spanish third group style are also to be seen, the latter occurring over the former, and therefore being more recent. Some of the paintings of the earlier Eastern Spanish style are of great beauty. The Vizor Rocks are of interest for three reasons. Firstly, for the occurrence of a large number of well-drawn horses, which, as we shall see, is of importance in the discussion of the date of the whole group. Secondly, for

the occurrence of at least two birds in this early style, none having been previously known. And thirdly, for the occurrence in the same style of a painting of one kind of animal, altered at another date into another animal, such for example as a big ox painted in light red, which has been repainted in chocolate as a stag. The paintings are of the Spanish second group, being naturalistic. Some of the black and brown bulls, without hanging fetlocks, show the artist's real mastery of design. The characteristics of the horses at El Arabi are a short tail with a tuft at the end like a mule or donkey, sloping crupper, big bulging stomach, the back often very concave, and no indication of mane. The ears are short, the head rather massive except in one instance where the animal is also remarkable for its elegance and length of leg.

The better of the two birds pictured is that of a stork taking flight. The design is half conventional, only the head being well made with a long beak. A single line runs from the neck to the tail forming the body and uniting with the legs which end in three claws arranged like a trident. The extended wings are indicated by a series of thick irregular upright and short strokes drawn from a more or less horizontal line. The second bird is also no doubt a stork, but the body is very sketchily drawn, the head being obscured by a lattice which may represent a net. In the lattice there are short strokes perhaps signifying a wing, and straight longer strokes ending in tridents which may be arrows. The two birds are painted in dark brown, and from their conventionalised manner induce one to attribute them to a slightly more recent period of the Spanish second group than the rest of this group here. There are some human figures of Palaeolithic age on the big rock, the little shelter shows none. The bigger rock boasts three blackish-brown human figures partially obliterated by Neolithic designs; in spite however of their Palaeolithic date they are entirely conventionalised. In the bigger of the rock shelters the paintings number about 73. Those in the naturalistic style include: eleven oxen, five stags, three hinds (?), three horses, three ibex, three men, two birds (swans), one carnivore, several signs of Palaeolithic age, two stags, two canidae, and three indeterminate animals of a more conventionalised style, one of which has a pointed

muzzle and a short tail, and finally a sort of lattice, also Palaeolithic and representing perhaps a net. The smaller rock shelter contains in all 43 figures. Seven horses, four stags, four hinds (?), six oxen, four ibex or goats, three indeterminate animals, a bird (?), and several signs; some indistinct symbolical figures seem to belong to a more recent date, and to be allied to the conventionalised art which is more fully represented in the big rock shelter. As at Alpera the oldest figures of animals are in light red, and have been partially repainted at a later period in brown, which produced a polychrome effect. The Neolithic paintings are in bright red, cutting clearly the Palaeolithic frescoes, as at Cogul and Alpera.

On the line from Murcia to Chinchilla, near the station of Agramon, is the rock shelter of Minateda, which contains hundreds of examples of this group; some thirteen distinct ages have been determined by super-position, but as is also the case with other places where this style occurs, these superpositions do not seem to have any but a local importance, except for the fact that the conventionalised drawings of the Spanish third style are always the most recent. Among the special animals figured which are important for the study of this group are: a possible rhinoceros, a possible reindeer[1], and an elk. There also seems to be a battle scene with men fighting with bows and arrows.

Further south in the Velez Blanco (Almeria) region, there occur a few paintings of Eastern Spanish style, amongst the large number of paintings of the Spanish third group which centre round that district. Velez Blanco is reached from the station of Lorca, on the line from Murcia to Granada. From Lorca the traveller must drive 40 kilometres into a dry waterless region seamed by gullies, sometimes 20 feet deep and only a yard or so across. In the absence of trees and vegetation to catch moisture the heavy rains carve these deep channels. The village boasts a fine old castle sheltered on one side by a grove of trees, noticeable in this treeless region. On the southern slope of the Sierra Maria, just on the edge of the plain of Archivel is the Cueva

[1] Reindeer never penetrated so far south. The drawing at Minateda must be the memory of some reindeer hunt in the north.

Chiquita. Legend says that a shepherd lad once shared this shelter with a little snake, which he fed with milk. The boy went away to the wars, and the first night that he slept in the cave on his return, the snake, grown into a big serpent, strangled him. In any case the grotto which bears the marks of use by shepherds and their flocks, is a sufficiently agreeable habitation. The wall facing the entrance is painted with three red stags of not very good proportion or design. Three semi-conventionalised human figures are to be found near the right-hand stag, the figures are poorly executed, and two of them by divergent lines in the middle show they are wearing a short garment. In a niche outside the shelter on the right there is a female ibex painted in red, as fine as the work of the best Palaeolithic artists in the Pyrenean region.

In the Estrecho de Santonje also in the Velez Blanco region, where the barren boulder-strewn hill-sides converge, there are three painted caves, only the far one shows traces of the Eastern Spanish Palaeolithic art, there being two pretty stags' heads painted in brown. One can only regret that so little of the surface of these paintings has escaped atmospheric destruction.

Near Los Lavaderos de Tello, where the cliffs have many rather inaccessible cavities, there is a little rock shelter on the left-hand side rather easier of access. Here are the silhouettes of two stags facing each other with some fragments of several others, some are painted in reddish-brown, others in polychrome, whilst the limestone crust on the walls covers other paintings. These stags are identical in style with the stags on the rocks of Alpera, Cogul, and Calapata. There are also a quantity of human figures, etc., of the Spanish third group. Not far from this latter place, often called Leiria, is the Cueva Ambrosia, where a series of deposits containing stone implements, etc., of unknown age remains to be investigated by the Institute of Palaeontology. Further west, on the Spanish third group sites already indicated, no traces of this naturalistic art have been found. There is one other poor site however lying some considerable distance north of Leiria.

It should be understood by the reader that though

mention has been made of the districts where this art occurs, by no means every rock shelter where drawings of this type are found has been named.

Having discussed the distribution of this group, we must now see if we have any means of dating their age accurately. The school of which M. Breuil is the foremost exponent claims that they are of true Upper Palaeolithic age. This is argued under three heads:

First. The occurrence in the paintings of animals now no longer living in these districts, such as the bison at Cogul, the elk at El Queso and Minateda (Albacete), the chamois at Tortosilla, and the rhinoceros and reindeer at Minateda. Ibex figured in the rock shelters, though rare in the south to-day, roamed over Spain in historical times, as witness the frequency of the name given to various ranges of hills, i.e. Sierras de las Cabras.

Second. The occurrence at Pasiega (Cantabria), and at Portel (Pyrenees), in the true northern Palaeolithic group of the antlers of stags painted in exactly the same way as the stag's antlers in the rock shelters of East Spain.

Third. The occurrence of a small red horse at Portel (Pyrenees), which is similar to those depicted at Cantos de la Visera (Murcia).

The arguments against the paintings being of Palaeolithic age, and suggesting for them a more recent origin, are:

First. The fact that these drawings are found in quite open rock shelters and not deep caves, which makes it difficult to imagine that they would have survived in such a good state of preservation the various previously enumerated destructive agencies.

Second. The occurrence of many human figures and of hunting scenes, etc. suggests a rather more advanced civilisation than that with which we have to do in the northern group. In this connection the future chapter on Magic should be consulted, still it is as well to say here that though these rock shelters may be of the nature of temples, there is nothing to enforce this conclusion as against mere decoration, as in the case of the northern group. However the absence of industries in these rock shelters would militate against their being "homes."

Third. Their distribution more or less on the east side of Spain and their absence in the centre and west would suggest an influence by sea from the east, and in this connection the similarity of some of the figures of the women to those of the Minoan age from Crete has been urged.

Fourth. Their extreme similarity to certain Bushmen paintings has to be accounted for, which might suggest that they were made by a portion of a race divided and dispersed by oncoming invaders, Neolithic or later, part of which were driven south (Bushmen), and part of which were driven to the east coast of Spain.

It should be remembered that whether the civilisation which gave rise to the Eastern Spanish style of painting be considered as autochthonous, or as coming by sea from the East, it cannot be considered as coming by land from the direction of the straits of Gibraltar, for no examples of this group are found further west than the province of Almeria. All that can with certainty be said at present is that this art is older than the Spanish third group, which always occurs, when in super-position, above examples of the Eastern Spanish style. This Spanish third group, as we shall see, is of late Neolithic or Copper Age, for pots that can be more or less dated are dug up, carrying incised conventional figures exactly similar to some of the animals and "idols" we find painted on the walls of rock shelters showing paintings of this group. Under any circumstances therefore the Eastern Spanish style must either be referable to a local Spanish artistic tribe of early Neolithic age, the like being never found elsewhere, of similar age to the culture that made the much more conventionalised drawings on pottery at Susa, in South Persia, in the early cities of Troy, and at Butmir in Bosnia, etc., or else, more probably as M. Breuil strongly believes, we are to refer it to a branch of the true Upper Palaeolithic or Capsian race, which developed a civilisation and an art in that lovely district of Eastern Spain bordering on the Mediterranean, which most resembles Italy in beauty and climate.

CHAPTER XXI

NEOLITHIC AND BRONZE AGE ART

THIS volume does not profess to give anything but very preliminary ideas on the culture of the Neolithic and still more the Bronze Ages. As has been already said, both of these ages require further study and this is especially the case with the Bronze Age. The art of these later periods, which, as the reader may be reminded, more or less coincides with Volume 5 of the geological record, when the climate of Europe became more like it is to-day, is, like the Palaeolithic art, divisible into several groups.

We find:

An *art mobilier*.
Decorations on tombs, and megalithic buildings
Drawings on rocks, and in rock shelters.

ART MOBILIER.

With the advent of the manufacture of pottery we get a new material very suitable for decoration, and from very early times we find pots or fragments of them having decorations either painted or engraved. Witness for example the wonderful painted pots from Susa, in South Persia, dug up by the French government delegation under the direction of J. de Morgan and others. Passing on to Egypt, leaving aside the pottery found in the early cities of Troy, we find pottery dating from pre-dynastic times decorated with paintings of spirals and conventionalised animals. Decorated pottery is found all through the dynastic period. Nor must we forget the various series of decorated pots from Crete dug up by Sir Arthur Evans; and even further west in South Spain the brothers Siret have unearthed a series of pots decorated with incised lines, conventionalised animals, geometric patterns, and the human form represented by two triangles placed apex to apex. The pottery of Butmir (Bosnia) decorated with spirals[1] or made into little statuettes of human beings must also be remembered.

[1] See Plate XLI, D.

These are but a few of the various famous localities that have furnished us with decorated pottery of these ages, but we cannot go more deeply into the subject as the study of pottery, its evolution, and the development of the decorative art on it would require a volume to itself.

Other objects beside pots have been decorated in this later art. For instance in the peat bogs of the ancient lake of Wauwil (Lucerne), of Neolithic age, a float of poplar tree bark was found by Fritz Sarasin which was engraved with a fish. This has been compared with certain fish sculptured in wood found in New Guinea, which seem to have been used as sympathetic magic to ensure a good catch.

In the true Bronze Age we get numberless decorations on metal objects for the study of which the reader is referred to works on that subject. We find therefore a very extensive and widely distributed *art mobilier*, the developments of which are very important in determining the evolution of culture from Neolithic, through Bronze and Iron Ages on to historical times.

MEGALITHIC TOMBS.

There is a series of engravings on Menhirs, Dolmens, *Allées couvertes*, etc., which must have been connected with the object for which these megalithic buildings were made. As the vast majority of these were of the nature of tombs and sepulchres we can only refer these drawings to some ritual or cult of the dead. These Megalithic monuments are found in many parts of the world, though it is not everywhere that they are decorated. Engravings are however found from Portugal to the Pyrenees, and in Switzerland, Alsace, Scandinavia, England, Scotland, Ireland, Brittany and La Vendée. They very often simply take the form of little hollows or cups, though the engravings are sometimes very complicated.

Four or five cups engraved on one side of a flat stone covering the chamber of the *allée couverte* of Taillant near Tarbes (Hautes Pyrénées) were evidently purposely placed so as to be invisible to those entering the burial cave. Examples like this could be multiplied.

Engravings of ships on dolmen-like constructions are to be found occasionally in Sweden, they are probably of

Bronze Age, and correspond with those engraved on rock surfaces, which will be described presently.

A very good locality for studying carvings on tumuli is in Ireland, where the decoration consists of geometrical figures, spirals, daisy-flower forms, lozenges, chevrons, etc. These engravings on the walls of tumuli in Ireland seem in part to be of the Bronze Age and in part of earlier date. Those that are of the same age as the tumuli are probably of the Bronze Age and are to be compared with the decoration on the Folkton chalk drums, found in association with a barrow[1]. Some of the engravings are older than the tumuli for the engravings disappear into the construction. It would seem to be a case of utilisation of stones already engraved by the builders of the tumuli. In this whole group of Irish prehistoric art there would seem to be four series of different technique and age[2]. Series 1 and 2 are older than the tumuli; 3 and 4 of the same age. Series 1 can be correlated with the engravings on a dolmen at Rathkenny, also in the case of the early engraved stone at Clonfinlough the similarity to some rock engravings in North Spain is striking. At the famous tumulus of New Grange[3] the four series are especially clear.

1. The figures are made by incised lines only. 2. The figures are pecked out by means of some sharp tool. A large number of the figures belong to this series, as also the majority of those at Loughcrew, at Sesskil-Green, as well as the engravings on the stones of the tumulus at Knockmany, etc. There was a negative painting of lozenges discovered by Professor Breuil (who made out these series) in one of the cairns at Loughcrew that may also be of series 2. 3. Broad and deep lines first pecked out and then rubbed smooth. The spirals at the entrance to New Grange belong to this series[4]. 4. The figures are no longer merely outlined but pecked out over their whole surface. In this series there are a number of triangles and diamond-shaped figures that appear alternately in high and sunk relief.

Spirals. The occurrence of spirals is particularly interest-

[1] See British Museum Bronze Age guide.

[2] Since this was written Professor Macalister has prepared a paper on the subject for the Irish Antiquaries compiled from Professor Breuil's notes.

[3] For illustrations see "New Grange" by Coffey.

[4] Compare engraved stone from Gavrinis (Morbihan, N.W. France).

ing. They are only found as decoration in Lower Magdalenian times, in Egyptian pre-dynastic times painted on pottery, and again in Egyptian twelfth dynasty times. Elsewhere they were found by Hoernes at the Neolithic station of Butmir, near Sarajevo, in Bosnia. This station has polished stone implements, little flint arrowheads, etc., and no metal. The human form is represented in earthenware, and some of the fragments of pots show a complicated geometric decoration of zig-zags, spirals, circles, lozenges, triangles that are often filled with punctuations, etc. It may be of the same age as the pre-dynastic pottery in Egypt.

In Malta there are temples, etc., and engravings occur—some spiral decoration. They are called Neolithic, bronze tools having been described from deposits filling the temples. The exact age and relationship to other cultures is uncertain.

Spiral decoration was used on pots in Crete during the latter half of the Bronze Age; about twelfth to eighteenth dynasties in Egypt. They are also found, as we shall see later on in this chapter, among the Bronze Age rock carvings of Scandinavia, and among the rock carvings described by Clarence Bicknell in Val Fontanalba behind Ventimiglia on the Franco-Italian frontier. These like the Scandinavian ones seem to be of Bronze Age judging by the form of riveted daggers represented in this series.

Some people have suggested that the idea of a spiral comes from the making of basket work.

Certain menhirs and flag stones have engraved on them a queer sort of idol; these are frequently coffin-shaped with two eyes and a nose often merely represented by lines, and they sometimes have hands and feet. For example, at Saint Sernin (Aveyron, France) there is a feminine idol, which is only one example among many. This however brings up the whole problem of the Neolithic and Bronze Age "idol," which will in part be treated of in the next section of this chapter when we deal with the rock paintings in Spain of this period. To summarise, therefore, we should note the existence of a series of drawings on menhirs, etc., and other megalithic buildings of Neolithic and early Bronze Age, most of which are unintelligible, although sometimes conventionalised human forms are indicated. These were obviously not carved out

of the hard rock to a considerable depth for mere amusement, but would seem to have been connected with some cult of the dead, or some worship of past heroes.

DRAWINGS ON ROCKS AND IN ROCK SHELTERS.

Up to the present there are three main areas where Neolithic or Bronze Age rock drawings are found in abundance. These areas are:

Spain (the Spanish third group).

Alpes Maritimes (the rock carvings round Monte Bego, inland from Ventimiglia, on the Franco-Italian frontier).

Scandinavia (the two groups of Scandinavia, with an outlier on Lake Oñega in North Russia).

There are other localities, of course, many of which have not been sufficiently studied, and their age not been definitely determined. Such, for example, are certain rock paintings in the Ural mountains, and the large number of rock carvings on broad horizontal surfaces of flat rocks in the Yenesei province of South Siberia. Even further east, in northern Manchuria there are rock engravings which were described years ago by a German writer, and which are of unknown age. Further investigation of these and of others, no doubt yet to be discovered, will help to throw more light on the meaning of these engravings, and on the origin and distribution of the workers in the late Stone and early Metal Ages who made them.

Spain, the Spanish third group.

It has been already remarked that a series of conventionalised paintings is found in rock shelters that contain examples of the Eastern Spanish style group 2. These conventionalised drawings when in super-position are always painted over those of group 2, and are therefore more modern. These drawings (Spanish group 3) have a very wide distribution over Spain. They are found in more than sixty rock shelters in the group of mountains that lie in the triangle determined by Algeciras, Cadiz, and Bobadilla. Again, a large number of them form a group in South-East Spain, the focus of which is the little village of Velez Blanco (railway station, Lorca), which lies

north-west of Murcia. The whole range of the Sierra Morena and the mountains continuing right away to the Portuguese frontier, especially in the vicinity of the village of Fuencaliente, are rich in them. Further north they are found in rock shelters in the valley of Las Batuecas, south-west of Salamanca, and as far north as the province of Burgos. The occurrence of the paintings of the Spanish group 3 on the same sites as those of the Eastern Spanish group 2 shows their distribution in the east of Spain and they are to be found from the north (Cogul) to the south (Leiria, near Velez Blanco).

A number of isolated rock shelters containing these drawings are found between these different districts; they are very important for providing links between these various centres of similar culture.

The reader must not suppose that the fact of these paintings being collected in various centres is in any way connected with the distribution in Spain of the folk who made them; it merely indicates that in these areas there was a plentiful supply of rock shelters suitable for the making and preservation of paintings. It may be safely affirmed that the people who made these drawings had spread all over Spain, from the valley of the Ebro to Gibraltar and the Sierra Nevada, the hard rocks of which still preserve for us in one place at any rate (Lubrin) some of the conventionalised drawings of human figures that are so typical of this school of art.

The occurrence of a rather similar style of paintings at the rock shelter of La Vache opposite Niaux on the French side of the Pyrenees, may indicate that a few of these people went even further north, crossing the Pyrenees by the passes of Andorra, and coming into France by the Ariège valley. However their general absence in France would seem to show that the ethnic group whose artistic sense or whose ritual created this type of art did not penetrate the wall of the Pyrenees to any great extent.

The distribution of this art westwards into Portugal, and southwards into Morocco has not yet been determined. The distribution southwards would be especially interesting, as the rock carvings of North Africa, which have at present

been noted by M. Flamand and others, are of a totally different character. This however will have to wait until the country is more peaceful, as it is in the limestone portion of the Atlas mountains, in Morocco, that the formation necessary for caves and rock engravings occurs.

What strikes the casual observer most when studying this art group in Spain is the large number of conventionalised human beings depicted. These human forms are made in various ways, and are best examined by studying one of the plates reproduced[1]. The simplest form is a vertical line showing a slight thickening at the top end and two oblique lines running downwards representing the arms and the legs. The difference of sex is indicated by whether or not the lower pair of oblique lines start from the very base of the vertical line. Other human forms are built up on a basis of two triangles placed apex to apex, on these the head arms and legs are sometimes placed or sometimes omitted altogether. Occasionally the triangles are not filled with colour, but merely shown in outline, and the final conventionalised form of three human figures would be . Sometimes the human figure seems to have degenerated into a circle with a vertical line through it. Sitting human figures are probably represented by a pair of zig-zags parallel to one another cut by a vertical line representing the body which sometimes has a knob at the top for the head.

Human beings are very common at Las Figuras (S.W. Spain) and are usually of rather a better made type, the legs and arms being well indicated; the double triangle method not being employed there, nor the "skeleton" form where the human figure is reduced to two or three lines.

An interesting group of human figures occurs in a rock shelter not far from Las Figuras, called *Las Mujeres*. We have here five human figures built on the double triangle system, but showing arms, no legs, and heads that indicate in at least one case an elaborate coiffure. There is also another female figure in a rude, but more or less naturalistic style drawn also with an elaborate hair-dressing. This coiffure

[1] See Plates XXXVIII, XXXIX.

recalls some paintings by Bushmen at Haco in the Orange River Colony. There is probably no connection between the two groups, as the Bushmen paintings more resemble the earlier Eastern Spanish school.

Amongst the series of figures at Las Figuras are many super-imposed. It is interesting to note that amongst the earliest represented here are some painted in white, a colour very rare in prehistoric art. A study of the super-positions has shown no sequence of styles.

It may be well to describe briefly a few examples of this art at various places in Spain which will enable us to judge of the general uniformity and the local differences found in separate districts; we shall then be in a position to discuss briefly the age and the origin of the folk who made them.

In the triangle of mountains, already mentioned, which is bounded on two sides by the railways from Algeciras to Bobadilla, and Bobadilla to Cadiz, and on the third side by the sea, there occurs, along with some limestones, some low hills composed of specially hard sandstones. These sandstones border to the west the lagoons that run parallel with the sea from the little village of Retin, near Tarifa, to the small town of Vejer de la Frontera, which lies about half-way between Cadiz and Tarifa Point. These very hard sandstones have been carved by denudation into fantastic shapes, often forming rock shelters that are the haunt of wild birds to-day. A large number of these rock shelters contain paintings, some being of special interest.

On flat surfaces of this hard sandstone in the same region there are also a number of tombs cut sometimes to the depth of a foot or more. These are more or less oblong in shape, about 5 feet long, and about 18 inches wide. The sides are undercut and there is no special shaping for the head and neck. The tombs are not orientated in any special direction. In at least one case near Tapatanilla which was visited by the writer and M. Breuil in the early days of 1914, there are definite grooves or gutters close by the tombs such as would have been made by the polishing of stone axes. These two tombs are close to the little shooting lodge of Colonel Willoughby Verner, who is well known in connection with

the bird life of the district, and who has taken a vivid interest in the prehistoric finds of his locality. Some primitive dolmens have also been found in this district. Several sites where art of the Spanish third group is found, for instance on the north side of the mountain of Bartholomé, will be specially noted in connection with the *raison d'être* of prehistoric art. The rock shelter of Las Figuras, which is described in the last chapter, p. 319, contains an extraordinary number of paintings[1]. Among these are:

Birds	178
Animals	103
Stags and hinds	84
Men	56
Signs	47
Ibex	14
Carnivora	11
Stars (1 moon)	6
Snakes	5
Huts	3
	507

The birds are of special interest, being rare in all prehistoric art. These were probably meant to represent the birds which fluttered over the lagoons hard by in late Neolithic or early Metal Age times. Only one or two other examples of birds are known in this Spanish third group, one of which suggests a duck's head and was found in the rock shelter called Covatilla de Rabanero in the Sierra Morena.

At Las Figuras there are some figures painted in white which are the earliest in this rock shelter. There is also a man bearing in his hand a hatchet which from its shape was probably made of metal; this may be compared with the hatchets, probably stone, painted

in the rock shelter of Bacinete, near Los Barrios, Gibraltar; also with another hatchet at Fuentepiedra, near Bobadilla; or yet again with another made probably of stone seen in the hand of a man painted at Los Molinos, Velez Blanco.

Las Figuras contains also a great number of stags with immense conventionalised antlers. It may be noticed in passing that the tines of these Las Figuras stags point forwards and upwards, while elsewhere and especially those from the Velez Blanco region (as for example in the rock shelter of Gabal) often have antlers of which all the tines of

[1] See Plate XXXVII.

the front antler point forward, and the tines of the other antler backward. This is only a local variation and indicates no difference in culture.

In a cave hard by Las Figuras, known as Pretina 1, we have some human hands designed, in only one case are the number of fingers correctly indicated. These hands are drawn on the walls, and are totally different from the Palaeolithic hands, whether they be of the negative or positive variety.

Elsewhere in the south-west district of Spain there are a large number of decorated rock shelters, most of which have not yet been published, and it would not be fair to describe them in any detail at this stage; but it may be mentioned that there is a very interesting human figure with outstretched arms and little human figures clustered below like chickens under a hen's wings. Finally at one place there is a painted spiral, a design which is of importance as helping to date the group.

The last series of the cave of La Pileta mentioned elsewhere is of the Spanish third group age. It is painted in coal black; the dominating figure is a horizontal line crossed by vertical lines, a type of figure found in the rock shelters of this age elsewhere.

Velez Blanco region (S.E. Spain). In this area there are super-positions with the Eastern Spanish style where the conventionalised figures of the third group are always the more recent. There are many rock shelters, two of which (Fuente de la Asa and Gabal) will be mentioned in another place. Besides these there are two places of main importance:

Fuente de los Molinos. As has been already pointed out there is a figure here with a hatchet, probably of stone, and an elaborate head-dress. There is another figure near but not armed, besides a number of other human figures of various kinds.

Los Letreros. Amongst a multitude of paintings there are a large number of double triangle idols connected together at their ends by painted lines, forming a sort of genealogical tree. There is also a man with a sickle in his hand which may have been of metal, or of wood studded with sharp flints.

In between this area and that of the Sierra Morena, in the mountains of Jaen, near the village of Jimena, is the Cueva de las Grajas. This contains a large number of interesting paintings where the human figure is portrayed, and it is here that is found the famous figure interpreted by M. Siret as an octopus and being of the nature of two circles from which project rays. This interpretation is almost certainly wrong, and we have probably only to deal with a further conventionalisation of the human figure.

In the Sierra Morena, and its continuation to the Portuguese frontier, we have a great number of rock shelters, the most important of which is the Piedra Escrita at Fuencaliente. Human figures, signs, and animals occur, and some of the former though conventionalised are full of life. At another rock shelter, Las Canforras de Penarrubia, there are paintings of animals being led by a halter, as well as other human figures[1]. At Peñon de Graja there are two splendid painted devils[2]; whilst at Batanera besides some chevrons, etc., there is a very interesting figure to be compared with similar ones found in connection with tombs (see fig.).

Further west, in the Almaden area there are some paintings of wheeled carts, the wheels when figured are represented in the same plane as the cart. These are probably the latest manifestations of the art, and may well be of the true Bronze Age (see fig.).

Las Batuecas. South-west of Salamanca in Estramadura in the valley of Las Batuecas, which is mentioned by Borrow in his *Bible in Spain* as being a place full of legends, we have three series of paintings in super-position and of very great interest. The earliest includes paintings of goats in dark brown which are fairly naturalistic. There are also *Signs and bars* which may well be compared with the painted pebbles of Azilian times already spoken of in the chapter on the Azilian period. If so, this older group of signs at Las Batuecas may be of Upper Capsian age. Dr Obermaier in his book *El Hombre Fósil* (Madrid, 1916) has compared a great many of the conventional signs of the Spanish third group with the signs on the painted pebbles of Azilian age dug up at Mas d'Azil[3], etc. Possibly this

[1] See Plate XXXVI. [2] See Plate XXXIX. [3] See Plate XXXVI.

early group at Batuecas, in which the animal figures are sometimes fairly naturalistic, may have been made by the Upper Capsians of Spain who were developing an autochthonous civilisation, which when driven north in its turn by the Neolithic invaders gave rise to some elements of the Azilian culture of France.

Again at Batuecas there is a second later group, painted in red, with no idea of perspective, which corresponds exactly to some of the earlier Neolithic figures of the Spanish third group. The last figures to be made at Batuecas were painted in white, and amongst them are some fish, always a rare occurrence in prehistoric art. The painted outline of these fish resembles that of a snow-shoe, there being some slightly wavy cross lines filling up the body of the fish, not unlike the horizontal cross webbing of a snow-shoe. The mouth of the fish is indicated by a slight indentation of the outline.

There are some curious designs at the caves of Atapuerca, Silo, and San Garcia, in the province of Burgos, which rather resemble fish-bones, feathers, and leaves. As has been already said, examples of this third group occur on the east coast of Spain, with paintings of the Eastern Spanish style. An interesting example probably of this age is found at Cogul, of a hunter armed with a bow and arrow shooting at a stag, and above it is the dead stag(?) lying upside down. In the country of the Eastern Spanish group, though not occurring with paintings of this style, are some paintings of the Spanish third group at the rock shelter of Mediodia (Yecla). The only figure of interest is one that may represent (in a very conventional way indeed) a human being on horseback.

The only other place we have to mention is a single instance in Cantabria, which, though rich in Palaeolithic art, has so far only yielded one example of the newer style. This is at Peña Tú, near Llanes (Asturias), a mass of rock on the top of a hill, something like ten cubic yards in size. It is very visible from all round; one side has been worn away, forming a rock shelter and in this there are painted punctuations, human beings of the skeleton type, both men and women, a long dagger (probably bronze) showing five rivet marks, and a complicated coffin-shaped idol[1] of the

[1] See Plate XXXVI.

type found engraved on Megalithic constructions, etc. A rather special group of rock engravings occurs at Galicia in Spain, they are comparable with the Spanish third group and recall those at Clonfinlough in Ireland.

But little excavation has been made in Spain, and in the south the most important work of this sort has been done by M. Siret. The occurrence of pots decorated with animals, similar in style to those of the third group and with the double triangle form of human being, is of great importance in helping us to date this group of drawings. Spanish archaeologists have definitely assigned the pots just mentioned to the Copper Age, i.e. late Neolithic to early Bronze times. Among such pots of this age may be mentioned those found by the Siret brothers at Las Millares (Almeria). Another has come from Velez Blanco excavated by Don Federico de Motos. Fragments of others were dug up by Dr Obermaier at the diggings of Las Carolinas, Madrid. Both from a consideration of these pots and from their position stratigraphically it seems clear that the whole of the Spanish third group (except the earliest series, which may be, as has been seen at Las Batuecas, Capsian or Azilian) may be assigned to Neolithic and early Bronze times.

In the Almaden district in the mountains continuing the Sierra Morena towards the frontiers of Portugal, there are paintings of certain wheeled conveyances which have already been mentioned, and in Portugal at Orca dos Juncaes, near Queiriga (Satam), paintings on dolmens are found of animals and men in flat red wash, similar to some of the Spanish third group. These may be of true Bronze Age, but as to their age in time, who knows?[1]

M. Siret suggests Phoenician influence in Spain when he attempts (in his book, *Questions de Chronologie et d'Ethnologie Iberiques*, 1913) to compare the art as found on his pottery with other manifestations of Neolithic and Bronze Age art. His whole theory, however, is very questionable and has been severely handled.

Mention has not been made of another type of engraved art that is found at one or two places in Spain, and is probably of rather more recent date. These engravings have been

[1] See *L'homme préhistorique*. February, 1907.

compared by J. Cabré with certain Minoan tablets. One site where they are found is in the region of Medina Sidonia, south of Cadiz. In this district some horizontal rocks in the open are engraved with a profusion of small signs only a few of which seem common to the Spanish third group. A type common to both is a series of figures similar to the "skeleton" painted men as (*a*), another as (*b*) recalls certain figures of the last series at La Pileta. They may be, however, quite modern.

a *b*

There are also some very finely-made rock engravings in a little rock shelter near one called the Cueva Pintada, from the red colour of the rock, in the mountains behind Tortosa. The engravings recall a skeleton leaf, and close by is the figure of a swastika painted in red. This may well be of Iberian age.

Scandinavia[1].

There are two series of prehistoric paintings and rock engravings in Scandinavia; an older, probably Neolithic, group, and a Bronze Age group. The older series, consisting of one naturalistic and the rest semi-naturalistic engravings, are found in Norway and north-west Sweden, engraved on the hard glacier-worn surfaces of rocks.

Up to 1914 the following examples were known, viz.: three Swedish, and the rest Norwegian.

Swedish.

Nämnforsen, on the Angerman river, close to Ädalslidens church, about 14 Swedish miles from Härnösand. 4 groups of engravings.

Glösa, near the village of Glösa, on the lake of Alsen in the county of Jämtland. 1 group of engravings.

Landverk, in Äre parish, on the north-west corner of the Ännsjön lake in Jämtland. 1 group of engravings.

Norwegian.

Sletjord, one Swedish mile from Narvik, on the farm of Sletjord on the Harjangenfjord, in the Nordlands Amt. 2 groups of engravings.

Sagelven, reached by steamer from Narvik to Sagfjorden, on the Sagfjord. 1 group of engravings.

Fykanvatn, 32 Swedish miles from Böla, just in the Arctic circle, in Melö parish on Glomfjord. The local steamers go to Selstad, one Swedish mile from the engravings. 1 group of engravings.

[1] See Plates XLI, XLII.

Böla, near the mouth of the stream Bölas, on the south shore of the Snaasenvand, on the farm of Valloens in For parish, 29 kilometres from Bardal. 1 group of engravings.

Bardal, just north of Trondhjem.

Hell, inland from Trondhjem.

Bögge, on the Langfjord, a branch of the Moldefjord, in the parish of Naesset, near the little hamlet at the head of Langfjord.

1 group of engravings.

Vingenfjord, at Vingen farm in Rugsund, outer Nord Fjord, which is at the eastern end of Froysjoen lake, 7 kilometres south-east of Hornelen.

3 groups of engravings.

Omun, on Glomfjord.

Paintings.

Leka, north of Böla.

Hindhammeren, a rock shelter on the northern side of Sundalsfjord, not very far from Bögge, which lies at the head of Langfjord.

Hastskotjärn.

Skarvängen.

Flatruet, in Härjedalen.

There are also one or two others and during the war the number found has been increased. The figures include animals, generally reindeer (only one pair of legs), fish, signs, human beings, etc.

Enough has been shown of the distribution of this group to indicate that it follows the western coast-line of Norway, only penetrating into Sweden behind Trondhjem. Geographically it would seem to bear to the main mass of engraving in Scandinavia (to be described immediately) the same relation as the Eastern Spanish style does to the Spanish third group. Some people have suggested that this art was due to Lapp folk, but this theory has been questioned by Dr Hallström, and certainly the technique employed by the modern Lapp is very different. Others have connected it, culturally at any rate, with the Maglemose civilisation, which as the reader will remember was the first civilisation to reach the shores of the Baltic, being probably derived from a developed Upper Palaeolithic culture of Eastern Central Europe, where people like the Azilians further south were driven westwards by the oncoming Neolithic race. Whether the group of drawings in question is connected in culture with the Maglemose civilisation or not, there seems evidence that the rocks at Bardal, on which

engravings of this type occur, were under the sea before *allée couverte* times. This group would therefore belong to late Neolithic times, since it is earlier, as is shown by super-position, than the second group (about to be described) which is of Bronze Age. As has been already said, except for one instance the style is only semi-naturalistic, only the silhouettes of the animals are indicated, except at Nämnforsen (Sweden) where the whole surface of the body of the animal is incised. Generally only two legs are shown. Sometimes the lines of the legs run across the body up to the line of the back. They are carved on hard glacier-worn surfaces of rock, the technique indicating that they were pecked out with a stone chisel, probably shaped like a cigar. These "cigars" have been actually found, and the rocks are too hard for a copper or even a bronze tool to have been of much use.

At Bardal there is a super-position with the second group of engravings composed largely of ships, the style of which is quite different. The figures of this group are engraved on the figures of the first series, and are therefore newer in age.

The second, Bronze Age group, is best studied in Bohuslain, north of Göteborg or Gothenburg, where more than 500 sites are known, occurring in special profusion in Tanum parish. The group includes ships, conventionalised animals (amongst which bulls are prominent), men fighting with hatchets, men armed with spears, etc. It is in this area that we have the well-known plough scene, and the cavalry battle[1]; there is also a figure like a serpent facing a man holding up his arms. Unlike the first group, the whole area of the animal has often been incised to a considerable depth, and not only the outline. The engraved ornamentation, including the occurrence of spirals and of the Bronze Age type of swords, points to their being of the Bronze or early Iron Age; but the complete absence of associated runes proves that they cannot really be assigned to the Iron Age.

[1] This cavalry battle scene, a photograph of which will be found among the illustrations, occurs on a small rock by itself. It may be rather later in age, as it has been suggested that the horse was not ridden in battle till rather later times.

Lake Oñega.

Further east in North Russia on the shores of Lake Oñega opposite Petrozavodsk, there is a small outlier of the Bronze Age art from Scandinavia. The engravings here were studied in 1914 by the writer and Dr Hallström of the National Museum at Stockholm. No more than a note can be given here of this interesting find. The engravings occur on little capes of intensely hard rock smoothed by glacier action. Close to the water's edge where wave action can reach it the rock surface has been actually polished like glass, and is here of a brownish colour. These little capes all occur just north of the Black River, where it flows into Lake Oñega.

The engravings comprise animals, signs, and human figures, and include definite scenes. One finds[1]:

A devil (the cross to the right on the devil's left hand is of much later date).

A hunter with a lance facing a quadruped.

A hunter throwing a harpoon.

A phallic scene (certainly one if not two).

A sturgeon.

Swans (in two cases the mother is leading her little ones, in another the feathers of the wings are indicated).

A sort of lizard.

Quadrupeds.

Fish.

Signs like mirrors, and other signs of unknown meaning.

Boats with animals' heads at the prows.

The depth of the engravings is from one to two centimetres, and, as in group 2 in Scandinavia, large surfaces of the rock have been removed. Everything that is coloured black in the illustrations has been actually carved away, and as the devil is about nine feet long, this represents an enormous amount of labour for this example alone. There is no difference between the patina of the unengraved and engraved surface of the rock, except in the case of the cross super-imposed on the devil's left arm. There however the cut is quite "fresh," though tradition in a village hard by says that it was placed

[1] See the last few plates where nearly all, except the swan with feathers shown on its wings, are figured. Plates XLIII to XLVII.

on the devil a long time ago to avert evil. It may have been added in the ninth or tenth centuries, when Christianity first reached that part of the world through Swedish channels. These considerations suggest a very considerable antiquity for the main mass of our rock carvings.

The rock is so hard that it is impossible to scratch it with a knife, and the technique of the drawings seems to indicate that they had been pecked out with a stone chisel, as was probably the case with Scandinavian engravings, at any rate in the first series.

It has been suggested from a consideration of the distribution of the canoe-shaped axes, and the so-called honeycomb pottery, that the great civilisation that had its cradle in South Sweden from Neolithic times onwards spread towards the north and then eastwards round the Gulf of Bothnia, in Bronze Age times. It may be that the folk of this extension made the rock engravings on Lake Oñega; on the other hand the absence of all rock engraving in Finland might rather suggest a direct connection between Oñega and South Sweden *viâ* the waterways.

In culture at any rate these rock engravings are probably of the same age as the second Scandinavian group, and therefore of the Bronze Age, though possibly rather later in time. Many of the signs are common both to the Russian and Scandinavian groups, as well as the drawings of ships, though in Russia the ships have animals' heads as prows, which occur but rarely in Scandinavia. The writer would also like to call attention to the number of swans engraved in Russia. In Bronze Age times the Ligurians of the south had a cult of the swan and the sun. They were great traders, getting amber from the Baltic regions and passing it down to the Mediterranean areas. Is there any connection between the two swan cults?

Dr Hallström has done a certain amount of digging further north than Oñega, in the White Sea area, the results of which will no doubt be published in due course. Stone implements found by Lieutenant Buddle at the mouth of the Dwina are considered by the writer to be of late Neolithic or early Bronze Age, and correspond to those of a similar age in Scandinavia. This is a further indication

of the spread of Scandinavian influence at that time over these north-eastern areas.

Elsewhere in Russia there are no prehistoric drawings till we reach the Urals, and after that a group in South Siberia. This group is found in the Yenesei province at Maidachine, Tess-sur-Tub, Potrochilovo, Abachauski Perevos, Trifonoffo, Koulak, and Kopessi. Some of these are engraved, others painted; a plate showing some of them has been reproduced by MM. Cartailhac and Breuil in their monograph on the cave of Altamira. There are animals rather conventionalised and human beings very much so. Part of this art may well be older, though some may be more modern and connected with the Scythians. As jade is found in the Yenesei province at the localities where this art occurs, and as jade was much sought after by the early Egyptians these engravings may be due in part to a culture drift from the Mediterranean basin.

There seems nothing to determine the age of certain rock carvings in northern Manchuria; it is to be hoped that further finds in these regions may give us more details.

Alpes Maritimes.

A series of rock carvings has been described by C. Bicknell from the rocks on the slopes of Monte Bego on the Franco-Italian frontier inland from Ventimiglia. The surface of the engraved lines has been pecked or punched out. From the occurrence of daggers and halberds of Bronze Age type they have been referred to the Bronze Age. There is also a plough scene executed as if one were looking from an aeroplane at a man ploughing. Spirals also occur, but those interested in a further description should read *A guide to the Prehistoric Rock Engravings in the Italian Maritime Alps*, by C. Bicknell, 1913.

We have now discussed the various main localities where this later art occurs; we have seen that in Spain there may be an oldest group of Upper Capsian age, at any rate at Batuecas, and probably elsewhere as well. These are followed by a main mass of Neolithic and Eneolithic paintings, while the last members of this group may be of true Bronze Age. This seems to be the cultural succession, naturally nothing is said of their age in time.

In Scandinavia the older group appears to be of late Neolithic Age, whilst the main mass seems to be of the Bronze Age. In the Alpes Maritimes from the form of the weapons the art seems to be of true Bronze Age.

Neolithic and Bronze Age art have been taken together in the same chapter, for, as has been already said in a previous chapter, both civilisations were probably formed from the same stock. In any case the time in which there were Neolithic people who lived anywhere near copper ores and had not discovered the use of metal seems to have been very short, though naturally in places where metal ore did not occur the use of stone was continued for a much longer period.

CHAPTER XXII

EQUIVALENTS AMONGST MODERN PRIMITIVE PEOPLES, AND THE *RAISON D'ÊTRE* OF PREHISTORIC ART

SEVERAL writers have already compared the various Palaeolithic cultures, with which we have been dealing, with the cultures of modern primitive peoples surviving to-day, or only just extinct. One of the most attractive of these comparisons is that of the Aurignacians with the Bushmen of South Africa. Not that it has been suggested that the Bushman of to-day, or at least of a few decades ago, is exactly similar in culture to the Aurignacian Man of nearly 20,000 years ago in France; but it has been suggested, and the suggestion is by no means unlikely, that from the same cradle, the exact situation of which is unknown, but may possibly be somewhere in North Africa or further East, sprang various migratory peoples. In prehistoric times the movement of these peoples was northwards and the two negroid skeletons of Aurignacian age at Mentone may be the representatives of one group of these peoples, resembling in type the Bushmen of to-day.

The main mass of the Aurignacian civilisation was formed by the white Neoanthropic Man. The various types appear to be unlike the Bushmen in structure, and they show no negroid characteristics. Whether or not this race came from the same cradle, as that from which sprang the negroid Aurignacian or the Bushman, is of course unknown. The true Aurignacian was certainly highly artistic, whether or not the Negroid Aurignacian was, we do not know. The only place where negroid skeletons have been found is Mentone, though the negroid bas-reliefs of Laussel may indicate a wider distribution of this people. It would be indeed strange if they were made by the non-negroid Aurignacian folk, unless they had come in contact with a negroid type.

In later times the migration was southwards, and the

Bushman of to-day may be only the later development of the civilisation of a people who migrated south under the influence of the oncoming Neolithic invaders, until they finally arrived in South Africa. Incidentally the Bushmen have a tradition that they came from the north.

Again the Magdalenians have been correlated with the Eskimos, who inhabit to-day the ice-bound coastal lands to the north of the New World, and also the similar lands, on the other side of the straits, in the north-east corner of Asia. But the vast difference in place and in time would make any exact correlation very doubtful.

One of the main factors in these comparisons is the occurrence of art on the one hand amongst the Aurignacian and Magdalenian folk of the older prehistoric civilisations, on the other hand, amongst the Bushmen and Eskimos of to-day. Sympathetic magic being the keynote of most of the modern primitive peoples, and ritual and art being the expressions of this, it is assumed by analogy, and no doubt correctly, that the art of the older prehistoric civilisations was made for similar reasons, reasons connected with a sympathetic magic[1].

Our old folk were hunters, and plentiful game and a successful kill were vital to their existence. No doubt the wonderful naturalistic animals, sometimes portrayed with the arrows of a hunter in their sides, formed part of this ritual, and were meant to ensure a successful hunt.

On the other hand, it must always be remembered that Man is largely a creature of his environment, and like physical conditions would tend to produce, in many cases, like cultures. Also the vast gap of time which separates our ancient civilisations from their *soi-disant* modern compeers must not be forgotten. The occurrence of such figures as the human hand, common to the two series, although perhaps it does not prove a definite relationship between the ancient and the modern races, must surely demonstrate in both cases some sort of ritual. The ritual may be quite different in ancient and modern times, though the occurrence

[1] By magic nothing extraordinary is meant. The early folk probably thought of their ritual as we think of taking medicine. Something done that will produce a definite result, a quite everyday occurrence, though naturally wonderful and weird and involving great outpouring of emotion in its performance.

of painted hands, mutilated by the removal of some upper joints of the fingers[1], suggests similarities.

Even to-day the human hand is the symbol for very different ideas. For example, on the one hand, the Mohammedan uses the figure of a hand to avert the "evil eye"; but in New Mexico a boy just come to manhood goes into a temple, dips his left hand in some white paint, and with it makes an impression on the temple beam. He is thereby an entity, though incomplete before the gods. When he has married, he comes again, and makes a similar image of his right hand near the left. He is then a complete entity. Our primitive folk had probably no such complex ideas as these, but some sort of magic is indicated as a hand is not a decorative object, especially when partially mutilated, as is seen on the cave walls at Gargas.

The occurrence of masked human figures in the art of the men of the Old Stone Age is also significant. Such masking is also found amongst the Bushmen paintings, as in the famous ostrich scene, where one of the ostriches is only a man disguised in ostrich plumage, from which projects his bow and arrow. This scene gives us some idea of the object of masking, at least among the Bushmen. Elsewhere, as amongst certain Papuan aborigines, masking had other and more purely ritual meaning. The certainty of masking is not always easily distinguishable in prehistoric art. Two cases are however beyond doubt. The one is a figure of a man on the walls of a Pyrenean cave; he has stag's horns on his head, and wears a short tail. The other case is in the *art mobilier*, and is found on the stag's horn *bâton-de-commandement*, from the rock shelter Mège (Middle Magdalenian age). The age is determined from the only deposit of this cave, which contains harpoons with a single row of barbs, and the bones of reindeer, and is therefore Magdalenian 5. Three little human figures are engraved among the other decoration on this *bâton*. They are dressed in the skins, and masked with the heads of chamois, but in the one case where the feet are shown these are quite human. The general attitude is that of men dancing.

[1] For a discussion on pretended mutilation of fingers among modern primitive peoples see Frazer, *The Dying God*, p. 219.

All these considerations are strong indications that in some cases at any rate the prehistoric folk decorated their caves and other objects for a definite purpose, connected with sympathetic magic.

However, although we have a strong probability, we are dealing with hypotheses rather than with scientific facts, and it may be well to cast our eyes over the whole realm of prehistoric art, and to consider more particularly the various conditions under which these paintings and engravings occur. As before, we shall have to separate the subject into various divisions and sub-divisions.

There are two main groups:

1. Palaeolithic art.
2. Neolithic and Bronze Age art.

1. PALAEOLITHIC ART

will have to be considered under three sub-headings:

A. Cave art.

B. *Art mobilier*.

C. Art of the Eastern Spanish style (if indeed it be truly Palaeolithic).

A. Cave Art.

Art is an expression of human emotion. It is fundamentally of the same nature as the clapping of hands when pleased. Musical people when moved by a strong emotion will express that emotion in music; painters again will express it by design and colour. We have to try to determine the feelings which swayed these early people, and to produce the reason of the emotional expression which we get in the form of these drawings.

Three possible purposes present themselves to our minds. They may have been made from *joie de vivre*, simply because an artistic race had to express their feelings by that medium, or, they may have been made for the adornment of their homes, as we employ wallpapers to-day, or as our ancestors employed embroidered tapestry, or, as we have already pointed out, they may have been made for sympathetic magic, to produce a plentiful supply of game, and a good kill.

Let us now examine a certain number of caves, and see whether the actual situation of the drawings will not throw some light on these questions.

Anyone going through these caves is struck at once by very obvious similarities. For one thing we notice the extreme naturalness of the animals depicted. There are of course evident exaggerations. The hair on the nape of the neck of the bisons at Font-de-Gaume is exaggerated out of all proportion; but details, such as whether the hoof is cloven or not, are faithfully rendered; and it is seldom difficult to determine the species of animal.

Especially in the southern regions, the number of signs, tectiforms and the like, impresses the explorer. At the cave of Bolao, as has already been stated elsewhere, these tectiforms occur in connection with a subterranean lake, and it may well be that they are concerned with this water. At other places, such as Castillo, these various kinds of tectiforms are really astonishing. At one place in this cave there is a sort of natural apse with a projecting layer of stalagmite, which forms a sort of altar. On the apse, behind this natural altar, are painted a series of scutiforms (a variety of tectiform), and the whole situation is pregnant with magic ritual. This altar has been used at various dates, for the paintings on the apse behind are not all of the same age. The last thing to be painted was a large black feathered arrow.

Again, in another part of the same cave, there is a little low corner, difficult of access. Lying in this, on one's back, one finds that the roof above is covered with these queer tectiforms.

In certain cases they may have been of the nature of inscriptions, for we find a panel covered with punctuations and signs in the cave of Niaux, not far from the main paintings, perhaps where it is possible to miss the turning or beyond which none but the initiated might penetrate.

Again, at the cave of Pasiega, in Cantabria, close to what was almost certainly the original entrance to the cave, there is a group of tectiforms that link together into a veritable inscription.

It has already been suggested that certain varieties of signs may represent weapons, and traps, that is pits, covered with the branches of trees, etc., into which the animal should fall. Whether they are really connected with any of the beasts amongst which they occur, is doubtful. They are

not associated with the animals with anything like the exactness that the arrows at Niaux are. The position of these arrows will be discussed in a moment.

The exact magical use, if any, of the tectiforms, when they represent hutments, is of course impossible to determine. Perhaps they were homes for the spirits?

When the explorer examines the frieze of hands at Castillo, and even more the mutilated hands at Gargas, he will have difficulty in explaining them under the heading of *joie de vivre*, or of decoration, and when he comes to sit on the throne of Pasiega, which is partly natural, but partly artificial, on which an implement—a rough disc made of limestone, it is true, but still an implement—was found, and looks on the surrounding decorations, if he has any emotion in him he will feel the presence of the sorcerer, who must have sat there in the dim ages past.

Again the explorer will be struck by the extreme inaccessibility of many of the drawings. We know from the occurrence of deposits containing man's implements, traces of fire, bones split longitudinally (man is the only animal who does this), that man's home was often in the mouth of caves, but there are no traces of his home life in the dark grim dank interior where he would be boxed in like a rat in a trap, by any chance enemy, man or beast, occupying the entrance. It has been suggested that some tectiforms were of the nature of constructions where ancestral spirits could live. This, of course, is pure hypothesis, but it is significant that tectiforms are often in cracks and fissures difficult of access at the end of caves. Niaux is a mile long, with plenty of wall space well removed from weathering action, not so far from the entrance, yet no trace of art occurs till we reach the extreme end of one of the branches, some 600 metres from the entrance. Not contented even then, prehistoric man painted one panel of punctuations and signs in a sort of alcove in the wall, up to which one has to scramble not without a certain difficulty.

Again, at the end of the cave of Pasiega (Cantabria) there is a narrow fissure to which it is only possible to gain access sideways, the walls are covered with drawings, especially tectiforms.

Once more, at the cave of El Pendo not far from Santander in Cantabria, there is a large chamber rich in deposits that certainly contain traces of Solutrean, Magdalenian, and, if the *escargots* or shell-fish can be used as an index, Azilian cultures. No trace of art is to be found on the cave walls. At the end of the cave there is a winding fissure difficult of access, and on crawling along this for some distance one comes upon a small panel with two birds engraved one above the other. The inaccessibility militates against the *joie de vivre* explanation, so does the fact that the dim interiors show no evidence of being used as homes. This latter also militates against the decoration theory.

Again, the explorer will especially note the occurrence of various palimpsests. Animals were painted and engraved over each other, no attention being paid to the species or the orientation of the figure underneath.

As has been said, the various figures of these palimpsests sometimes belong to different styles of art which are referable to different epochs. On the other hand, at such places as Teyjat and Combarelles, we find, cutting one another at any angle, engravings that are not far different in age from each other. This could never have been thought decorative.

Lastly we notice the extreme rarity of any attempt at grouping. In fact, if we omit the ox following his cow from Teyjat, the male reindeer leaning forward to lick the face of his female at Font-de-Gaume, and the stallion following his mare at Font-de-Gaume, and the clay bisons (male and female) at Tuc d'Audoubert, we find an almost complete absence of any attempt at grouping in the cave art.

In other words, the important point seems to be the single animal, and not the picture. We find arrows in the side in the case of some of the bisons, at Niaux in the Pyrenees, and the horse at Castillo, in Cantabria; but nowhere in the true Palaeolithic art do we find anything of the nature of a scene representing a hunt. Incidentally the size of the animals seems to be unimportant, some being drawn small, others big. The human figures (always very badly represented) are never shown armed with bow and arrow, aiming at some painted animals on the cave walls hard by; and yet slightly curved bones, which may very well have been

hafted thus (ᚴ) to form barbed arrowheads, have been found in the Magdalenian deposits at Castillo, and the arrows, such as those in the sides of the bisons at Niaux, may well have been shot from a bow. These arrows at Niaux are by no means chance later additions to the paintings, for in two cases, and in one in particular, the position of a bison finely engraved on the floor has been determined by three little natural hollows that have been formed at some anterior date by water dropping from the roof. These holes are made to represent three wounds in the beast's side, and are emphasised by three engraved arrows at the edge of the depressions. Still, even in this case, although we seem to have the expression of a desire enacted before us, we have only to deal with a single figure; there is no scene with several actors presented to us, no play-acting in picture of the successful hunt that was no doubt hoped for. The arrows under these circumstances surely suggest magic.

Any explorer who goes through the caves, and notes these things, will have forcibly to drop, in most cases at any rate, the *joie de vivre* and the decoration theories; and the only conclusion that fits the facts seems to be the magic theory, and this as we have seen is backed up by modern analogy. Of course we must not rigidly rule out the other possibilities in every case. It is perfectly conceivable that the fish decorating the roof at the rock shelter of Gorge d'Enfer, and the frieze of horses, and the bison in the rock shelter of Cap Blanc, may be of a decorative nature, but we are dealing here with a rock shelter where Man lived—from which we can dig up his deposits—in other words, his home. This is very different from the art in the depths of caves, which so absolutely leaves on the mind of the explorer the impression of a temple[1].

B. Art Mobilier.

When we come to the *art mobilier* we find ourselves in the presence of rather a different state of affairs. To begin with, as has been already stated, engraved bones and weapons are of much wider distribution than the cave art. Again we have much less uniformity in the *art mobilier* of the home than we have in that of the cave. For example, as has been

[1] See Addendum note to page 321.

pointed out by M. Breuil, even in the Périgord district itself, though the rock shelter of La Madeleine, near Les Eyzies, has furnished us with a large number of engravings, there are hardly any made on flat stones, or on chance fragments of bones, or on unworked fragments of reindeer's antler. Laugerie Basse on the other hand, though furnishing us with a comparatively small number of engravings on stone, supplies a very large number of engravings on the antlers of reindeer, fragments of bone unworked, or only slightly so, sometimes broken off with merely a single blow. Les Eyzies itself, on the contrary, has but few of these bone engravings, being specially noted for its carvings on stone, also for the remains of long blades of bone fashioned into pendants. On the other hand Raymonden, and Souci, not so very far off have nothing comparable to these.

We shall possibly better grasp the reason for this art in two connections if we consider firstly the decorated completed objects such as weapons or pendants, and secondly the mere fragments of bone or stone which bear engravings on them. In the first case there is no reason why the artistic feeling that must have been in these folk should not have expressed itself in a desire for decorated and beautiful objects. Many of the weapons, such as some of the harpoons which are merely decorated with lines, or simple geometrical figures, may come under this category. Again, the women of these days (and the men too, very likely) liked collars, bracelets and pendants, as is seen from the number of bones and teeth pierced for threading, and these may be often further beautified by decoration. On the other hand, there is no reason why some of these pendants, often pierced for stringing, may not have been of the nature of ju-jus, or magic amulets, and when we find that weapons are often decorated with the figure of the animal that they are intended to kill (such as the fish which occur on harpoons), and when further, as has been discussed in the chapter on *art mobilier*, these figures are conventionalised into signs, which cover the weapon, we begin to think that even here magic was at the root of the matter. The weapons were to be made efficacious. These conventionalised signs for the animal, evolved by stages from the figure of the animal

itself, were copied, as has been pointed out previously, by succeeding generations, who occasionally even misrepresented them, by, for instance, renaturalising them, but placing the head where by rights the tail ought to have been. Is not this a sure indication that they were made for some special purpose and were copied by succeeding generations? On the other hand, when we come to consider the engraving on chance bone and stone, etc., we may well draw another conclusion regarding their object.

No one who examines the wonderful cave drawings can suppose for a moment that they were made by the light of Nature, without any preliminary training or practice. As has been already pointed out, the similarities in the changes of styles in widely separated areas, argue for schools of traditions, or a sort of medicine man caste.

Now many of the chance engravings on bones, stones and horns may be often merely the expression of emotion in an artistic race, some chance man, woman, or child drawing these animals from *joie de vivre*. At Laugerie Basse, the male reindeer following his female (wrongly called "Le Combat des Rennes") is a *chef-d'œuvre*, and there is no reason why it should not be merely an expression of artistic taste. Incidentally it may be noted here that we have a case of grouping almost as rare in the *art mobilier* as in the caves. On the other hand the young novice has to learn his trade, and the occurrence of these engravings on chance fragments in the deposits of certain sites may indicate something comparable to schools of art. Crude studies of this nature are often found. Finally, even the trained artist would probably have to take a sketch with him into the caves, before he executed such beasts as the bison at Niaux. These sketches would be exactly comparable to the little drawings that the artist of to-day makes before executing his work on a large canvas. The prehistoric artist would make these drawings from Nature, drawings which could then be executed at leisure on the temple walls of the caves in the bowels of the mountain. Compare the horse engraved in the vestibule at Hornos de la Peña, with the exactly similar engraving of a horse on bone found in the deposits[1].

[1] See Plate IX, A, B.

We may note then, that in the *art mobilier*, though magic played a great part, decoration must certainly be included, and besides we have probably sketches made by the artist to take into the cave with him, and also school practice.

The painted pebbles found at the extreme end of Palaeolithic times, in certain Azilian deposits, must not be forgotten. These painted pebbles have been compared by some with the "churinga" of certain modern primitive peoples of Australia, others have only seen in these paintings the human form, highly conventionalised, whilst others have merely considered them to be a kind of currency. The fact is we know nothing, as yet, about their significance, and they cannot therefore be used to prove or disprove a theory.

C. Art of the Eastern Spanish style.

We have already discussed the age and the origin of the Eastern Spanish style, and we have come to no very definite conclusion. We have seen that there are arguments in favour of the view that the drawings are Palaeolithic, and this is the orthodox view. So they are treated of under the Palaeolithic heading. It is certain, at any rate, that they are older than the conventionalised drawings of the Spanish third group. When we come to examine them with a view to their meaning, in the same way as we have already done with Palaeolithic art, several new points suggest themselves.

First. We find a large number of human figures, the men often armed with bows and arrows, the women clothed.

Second. We find grouping in some cases, for example the women dancing round the man at Cogul[1], the hunter facing the chamois at Tortosilla; and that poignant picture at Alpera, in which in the first scene one sees the hunter ready to shoot an arrow at a stag, which is putting out its tongue at him, while just above is scene two, where the arrow has flown, the stag is transfixed, and is walking sorrowfully away.

Again, in the province of Castellón, where comparatively lately a group of this style of paintings has been found in the Barranco de Valltorta, we have a regular hunt of deer-like animals, which are being driven towards a line of hunters armed with bows and arrows. In this group the male figures

[1] See Plate XXXIV, B.

are especially elongated, and have been likened to the elongated shadows of men cast by a low sun on a white wall.

As has been already stated, these Valltorta drawings, themselves clearly of Eastern Spanish style, bear an extraordinary resemblance to some of the Bushmen drawings of South Africa.

We rarely find any traces of man's home under the rock shelters where these Eastern Spanish paintings occur, nor have we indeed any very definite knowledge of what the civilisation of the Eastern Spanish painters resembled. The happy find of some chance deposit definitely of this age may enlighten us in the future.

For the moment we shall have to content ourselves as regards the object of these drawings with comparing them to those of unknown significance made by the Bushmen, and considering that they probably had a magical significance, possibly more complicated and advanced than appears probable in the northern Palaeolithic series.

2. NEOLITHIC AND BRONZE AGE ART.

These have to be considered under three heads:

A. *Art mobilier*.

B. Art on tombs and other buildings.

C. Art on rocks, and in rock shelters.

A. This is especially found on pottery, and may often have been purely decorative. On the other hand the fishing float of poplar bark from Wauwil (Lucerne) decorated with the engraving of a fish, suggests that even here magic must not be forgotten. We find the same thing used for magic purposes in New Guinea.

B. Dolmens, and *allées couvertes*, etc., often show geometric decoration. This must surely indicate some unknown ritual connected with the dead.

C. As regards the art found on rock surfaces or in rock shelters it may be useful, as before, to examine in detail one or two places where this art occurs. The whole question is of considerable difficulty, because this later art, as has been shown, is not uniform in the various parts of Europe, where it occurs. We shall therefore have to discuss briefly what

we can find out as to its *raison d'être* in the various countries in which it is found.

Spain.

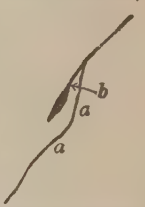
It has been pointed out that this later group of art (Spanish third group) is always posterior, being super-posed upon the figures of the Eastern Spanish style (Spanish second group). It is also posterior to figures of the ordinary Spanish art (Spanish first group) at the southern outlier of La Pileta. The main point that the casual observer notices is the extreme conventionalisation, and the large occurrence of human figures conventionalised into various simple forms.

The chapter on the Neolithic art of Spain has demonstrated certain local differences from various parts of Spain, but it is probable that this was the art of a single group of people, and can be considered as a single whole.

There are three rock shelters in the country behind Cape Trafalgar which may help us in our considerations.

Bartholomé I. The first one is half-way up on a hill-side, is called Bartholomé, and lies not far from Tarifa. It is in the form of a fissure, sloping very steeply up into the hill.

When one crawls into this fissure and lies back on the floor, one is nearly upright, looking at the ceiling which forms the outer side of the fissure. This ceiling is covered with paintings. The floor on which one lies is hard, rocky, and damp. It can hardly be suggested that this was a decorated "home."



a a is the floor of the fissure. *b* is the ceiling on which are the paintings.

Again, on the opposite side of the lagoons, those wonderful sheets of water that run parallel to the coast, and which are covered with water-lilies and wild-fowl, where great bustard, golden eagle, and sometimes vultures 9 feet across the wing fly round one's head, lies the rock shelter of Las Mujeres.

Las Mujeres. This might well have been a prehistoric home. Among the paintings that occur there is a group of women, ranged in line, one wearing a very elaborate head-dress. There are five women, divided into groups of two and three, one pair each side of a painted red figure in the form

of a rectangle. This group has obviously a meaning, of which it is evident we can never be certain. As a matter of pure hypothesis, it would be satisfactory to liken the rectangular figure to some of the tombs of unknown age, which we have described in our chapter on Neolithic times, tombs such as are cut into the sandstone of the rock hard by. This is merely hypothesis, but are we to see an early cult of the dead?

Las Figuras. Further north lies the Valle Hermoso, and in it on a projecting spur of sandstone is the Cueva Figuras. This grotto is in the form of a short tunnel, the mouth of which opens 15 feet up on the side of a precipice, and which itself slopes steeply up for six or seven yards, and ends in an apse. It can only be reached to-day by a ladder, and in order to walk up the sloping tunnel, it is necessary to remove one's shoes, to prevent slipping backwards and falling over the edge of the precipice.

On the sides, and especially in the apse at the end, there are some 507 paintings, which have been described in the chapter on Neolithic art.

The absence of all marks on the walls, such as would have been left by a wooden staging, shows it was never used as Man's home; without such a staging Man would never have been able to live on the steeply sloping floor of the tunnel. This, with its inaccessibility on the face of the precipice, and its prominent position, jutting out into the main valley, suggests irresistibly some form of temple.

Velez Blanco region. Let us now go into the Velez Blanco region (Almeria) and examine the rock shelter of Gabal. This opens at the base of a low cliff, lying at the top of a steep talus. It may well have been inhabited, and there is no trace of art in it. Over the lintel, however, hardly accessible without a ladder, there is a niche full of paintings. Were these to keep off evil from the home below?

Again, on the other side of Velez Blanco lies the Cueva de la Fuente de la Asa. Access to this rock shelter is gained by a sort of ledge along the face of a low precipice. The rock shelter itself contains no paintings, but on the way thither a niche is passed full of punctuations and human figures. Again one asks: Was this a protection for the home?

We find then as before, that, even among these conven-

tionalised drawings, there is probably some deeper meaning than mere decoration. But the occurrence of human beings, though often conventionalised, probably indicates a more advanced thought than we had to deal with in the early groups.

Certainly in one instance, in a rock shelter in the Sierra Morena, an animal is led, an idea far removed from any thought of hunting[1].

The general impression left on the mind of the explorer is, that these paintings were made for some unknown ritual, and that they were of the nature of pictographs, the meaning of which is forever hidden from us.

As has been noted in the chapter on Neolithic art, a similar style of drawing has been found incised on pots, where the regular double triangle idol, etc., is displayed.

Peña Tú (*near Vidiago, Oviedo*). Peña Tú, with its sword and painted idol[2], similar to those found engraved on dolmens, may well represent some ritual of the dead, and the prominent situation on a rocky hummock, in an outstanding position overlooking the sea, is quite in keeping with the idea of it being a sacred spot.

Scandinavia.

As has been pointed out there are two groups, an older, probably Neolithic, and a newer, Bronze.

The occurrence of little men (painted), similar to those in Spain, in the first group at Leka[3], in Norway; and a plough scene, and cavalry battle scene[4], in the second group, near Tanum (Sweden), should be remembered. It must have been no joke to carve the immensely hard glacier-worn rock surface, and there must have been some object, but there is nothing to tell us what that object was. In the majority of cases we do not find grouping, or scenes depicted; it therefore does not seem to be a case of history of events, carved to refresh the memory of future generations.

The outlier of this group, at Lake Oñega, Russia, has already been described. It tells us no more as to meaning, though the occurrence of a phallic scene is interesting.

[1] See Plate XXXVI.
[2] See Plate XXXVI.
[3] See Plate XLI, C.
[4] See Plate XLII.

Alpes Maritimes.

Another group where an art on rocks occurs (probably of the Bronze Age) is in the Alpes Maritimes. Here again we have a plough scene, a spiral, etc., though, as a rule, little in the way of real grouping. The engravings mostly lie on the side of a mountain, over the slopes of which one gains access to the high plains of Piedmont, from the sea coast. There is really nothing to give us a clue to their meaning.

To summarise briefly, the older Palaeolithic art was probably a sympathetic magic to ensure a plentiful supply of game, and a good catch of the particular animal depicted. It falls into the same group as the little images made in wax of one's enemy, whose death is assured when the wax is slowly melted or stuck with pins.

In the *art mobilier* of Palaeolithic times we have probably examples of a similar magic, but here the rôle of pure decoration must not be forgotten, also the fact that the artist had to practise his vocation, and make sketches for the more serious work in the caves beyond.

As regards Eastern Spanish style, we have frankly to admit that there is practically no clue to the meaning of the art.

Finally, as regards Neolithic and later drawings, in Spain at any rate, we seem to be in the presence of some magic ritual, but of a more complicated order than in the case of our early groups. We probably have to deal with pictographs, and in some cases they may be of a nature for the protection of the home. In other cases they may be connected with other cults, such as that of the dead, etc.

The absence of events depicted in scenes militates against their being of the nature of history. As regards the examples of this art outside Spain little can be said, except that in view of the hard nature of the rock on which they were worked, they can hardly have been executed for *joie de vivre*.

Addendum Note.

The position of the masked figure at Trois Frères is important, see *Man*, vol. xxi, 1921, No. 108. Here it can only be noted that the painting dominates an alcove, the lower parts of the walls of which are covered with engravings. The figure can be reached from behind, up a fissure, so that a sorcerer could stand beside it and dominate an audience in the alcove below.

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PLATES

PLATE I. LOWER PALAEOLITHIC TOOLS.

From specimens in the author's collection.

Scale: No. 1 is 7·2 ins. in length, others in proportion.

1. *Coup-de-poing* from Hoxne (Suffolk).
2, 3. Twisted oval *coup-de-poing* from "l'hermitage" (Somme valley); 3, showing the twisted edge.
4, 5. Acheulean oval *coup-de-poing* from the upper gravels at Three Hills (Suffolk); 5, showing the top face. The patina is different on the two faces.
6. Chellean *coup-de-poing* from "l'hermitage" (Somme valley).
7. Small disc from Le Moustier (Dordogne).
8. Small flat *coup-de-poing* from Hoxne (Suffolk).
9. Small triangular *coup-de-poing* of Lower Mousterian age from Combe-Capelle (Montferrand, Dordogne).
10. *Coup-de-poing* from near Constantine (Algeria).
11. Oval *coup-de-poing* from "l'hermitage" (Somme valley).

    If the under face was a flake surface with a small plain or facetted striking platform, the figure would represent a Mousterian *Levallois flake* (for example exactly similar to a specimen from Baker's Hole, Northfleet). Note that the flaking on the top face would have been done, and the implement blocked out, while still on the core. It would have been then struck off by a single blow, leaving behind a tortoise core.
12. *Coup-de-poing* (the end broken and reworked) from Sturry, near Canterbury. Note the enlarged butt so characteristic of the English Lower Palaeolithic.
13. Mousterian trimmed flake from Le Moustier (Dordogne) with a facetted butt.
14. Small *coup-de-poing* in red quartzite from Tabelballa (North Africa).
15. Same as 13 showing the butt and the flake side.

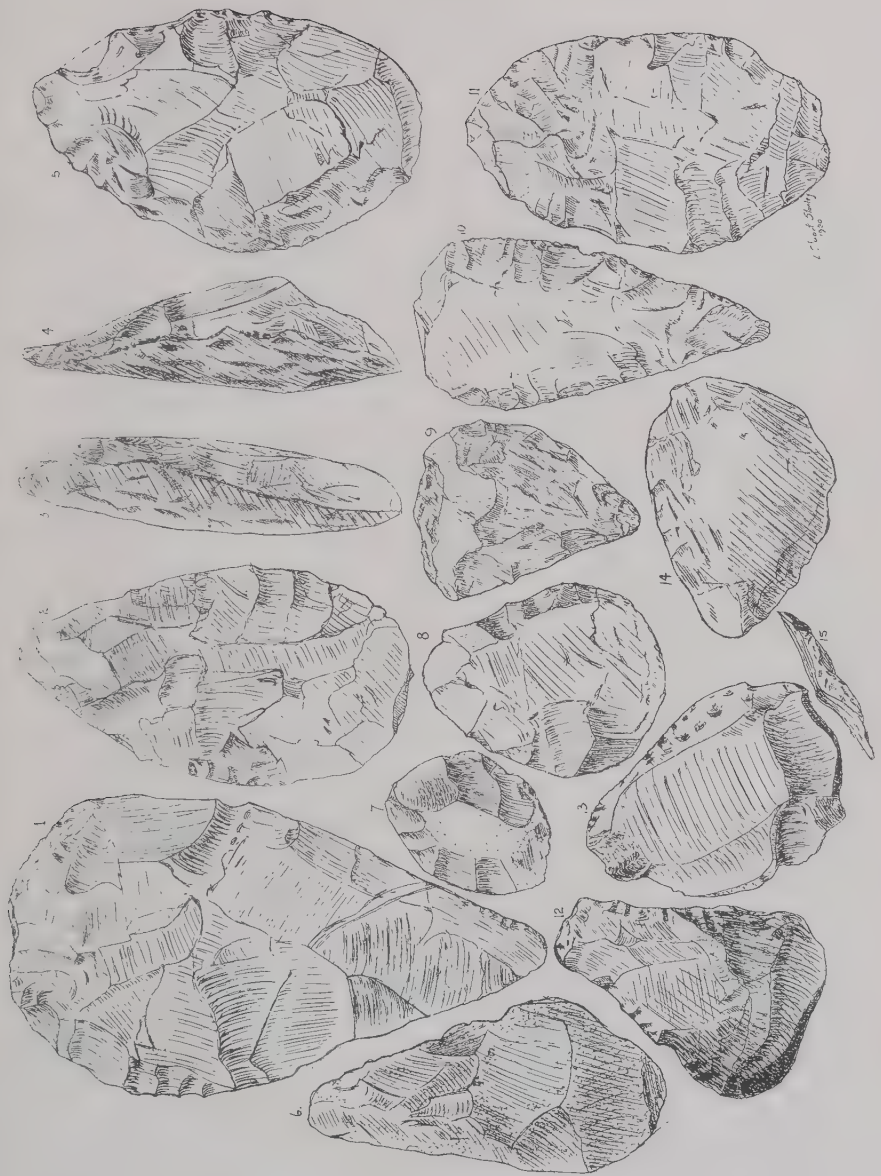

PLATE II. SCRAPERS.

From specimens in the author's collection.

Scale: No. 21 is 2·3 ins. in length, others in proportion.

1–4. Keeled-scrapers from the Middle Aurignacian of Laussel; 1, from above; 2, full face; 3, from above.

5, 6. Side-scrapers from La Quina (Upper Mousterian age).

7. Side-scraper from Le Moustier. Third layer upper rock shelter (Mousterian age).

8. Double-end scraper with central keel from Laugerie Basse.

9, 10. End-scrapers pointed at opposite end, from the top deposits at Masnaigre; 9, with trimmed edges; 10, with central keel (Upper Aurignacian).

11. Double end-scraper with trimmed sides from the top deposits at Masnaigre.

12. Nose-scraper from the Middle Aurignacian of Laussel.

13. Conical keeled-scraper from the Middle Aurignacian at Tarté.

14. Conical scraper from Laugerie Basse (Magdalenian age).

15. Side-scraper from the third layer of the upper rock shelter of Le Moustier.

16. Side-scraper from La Quina (Upper Mousterian age).

17. Core-scraper from Middle Aurignacian of Laussel.

18. Round Azilian scraper from the coastal stations of the Bas-Médoc.

19. Nose-scraper from the Middle Aurignacian of Laussel.

20, 21. Double end-scrapers, sides not trimmed; 20, from Laugerie Basse; 21, from Masnaigre (Upper Aurignacian level).

22. End and nose-scraper from the Lower Aurignacian of Laussel.

23. Nose-scraper from the Lower Aurignacian of Laussel.

24. End-scraper from the Lower Aurignacian of Laussel.

25. Side-scraper from the only archaeological deposit at Chapelle-aux-Saints (Mousterian age).

26. Double core-scraper seen sideways, from Laugerie Basse (Magdalenian age).

27, 28. Core-scrapers, seen from above, from Laugerie Basse (Magdalenian age).

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L. Stuart Stanley
June, 1920.

PLATE II

PLATE III. POINTS.

From specimens in the author's collection.

Scale: No. 1 is 2·2 ins. in length, others in proportion.

1–3. Mousterian points from La Quina.
4. Audi point from l'Abri Audi.
5. Font Robert point from Laussel.
6. Double-shouldered point from Masnaigre (Upper Aurignacian age).
7. Single-shouldered point from Masnaigre (Upper Aurignacian age).
8. Double-shouldered point from La Ferrassie (Upper Aurignacian age).
9. Châtelperron point from near Constantine (Algeria).
10. Audi point from near Constantine (Algeria).
11. Châtelperron point from near Constantine (Algeria).
12, 13. Châtelperron points from Laussel.
14. Upper Mousterian tanged point in red quartzite, from Tabelballa (North Africa).
15. Mousterian point from Castillo (Cantabria).
16, 17. Mousterian points from Le Moustier (Dordogne).
18. Upper Mousterian tanged point in white quartzite, from Tabelballa (North Africa).
19–21. Barbed points from North Africa.
22–25. Solutrean single-shouldered points; 22, from Laussel; 23–25, from Le Placard.
26. Gravette point from Laussel (Upper Aurignacian age).
27. Gravette knife blade from Laussel (Upper Aurignacian age).
28. Flat Solutrean point from Laussel.

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L. Hewett Manley

PLATE III

PLATE IV. GRAVERS (*BURINS*).

From specimens in the author's collection.

Scale: No. 15 is 2·5 ins. in length, others in proportion.
1–12, screw-driver type. 13–21, gouge type.

1–3. Ordinary or *bec de flute*; 2, single facetted; 3, double facetted.

4, 5. Single-blow gravers; 4, on a broken edge; 5, on a naturally-pointed blade.

6–11. Angle-gravers; 6, transverse-straight; 7, transverse-concave; 8, oblique-straight; 9, oblique-concave; 10, oblique-convex; 11, oblique-convex, *bec de perroquet*.

12. "Noailles" angle-graver, with side notch.

13–15. Beaked gravers; 13, with notch; 14, 15, without notch.

16. Planed or flat-faced graver (French, *plan*).

17. Gouge-angle-graver (only one of the various varieties is shown).

18. Single-blow graver (gouge type).

19, 20. Single-polyhedrics.

21. Double-polyhedric.

22. Tardenoisean graver (note the graver facet is carried over on to the flake face of the tool).

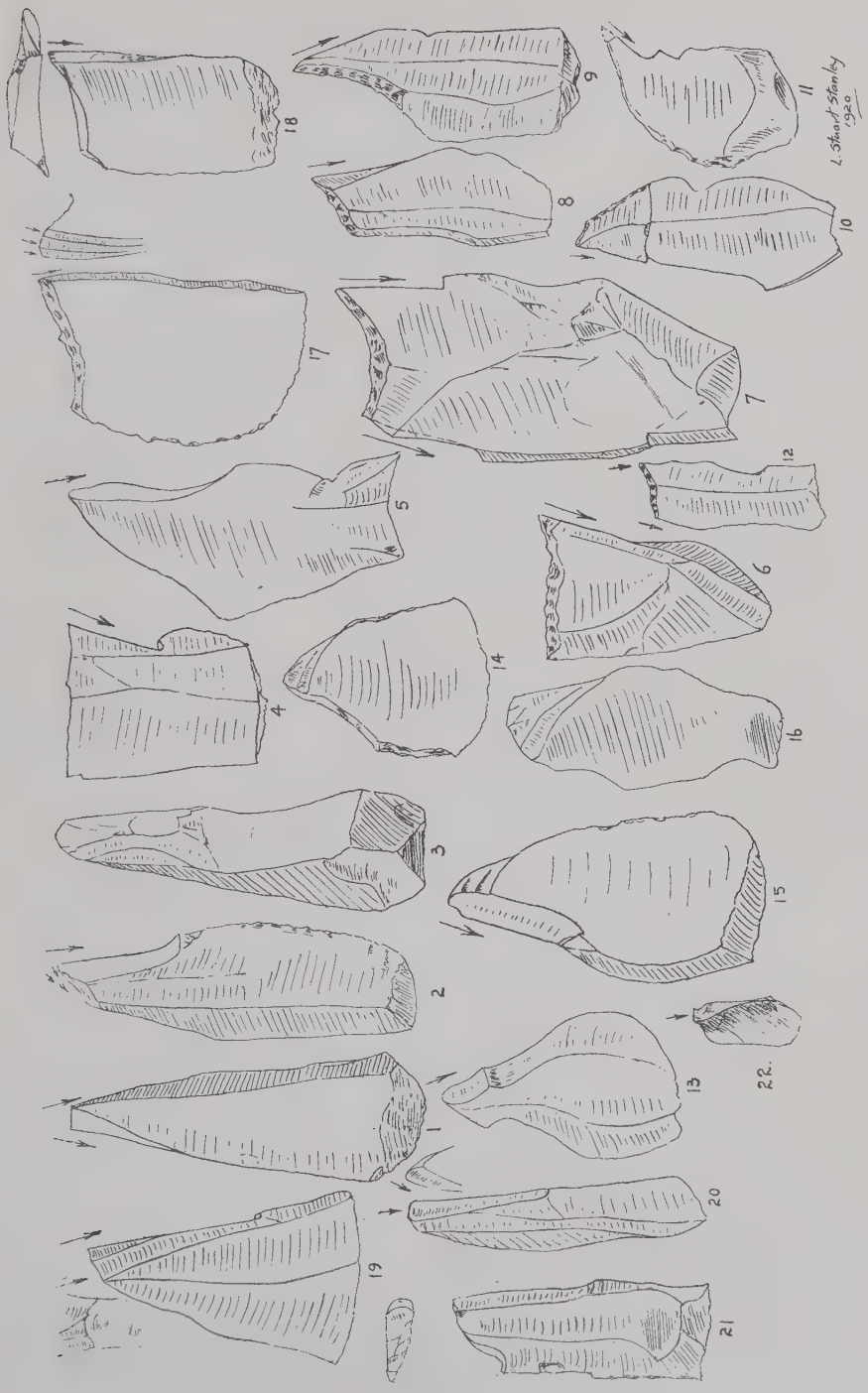
L. Stuart Stanley
1920

PLATE V. TOOLS.

From specimens in the author's collection, except 5, which is after Breuil.

Scale: No. 6 is 5·6 ins. in length, others in proportion.

1. Laurel-leaf of Solutrean age from Laugerie Haute.
2, 3. Willow-leaves of Solutrean age from Laussel; 3, showing the under side.
4. Laurel-leaf of Solutrean age from Laugerie Haute.
5. Flat stag's horn harpoon of Azilian age from Mas d'Azil.
6. Pointed blade of Middle Aurignacian age from Masnaigre.
7–10. Awls of Magdalenian age from Laugerie Basse.
11. Awl of Azilian age from the Bas-Médoc.
12. Tap-borer (French, *taraud*) from Laugerie Basse.
13–14. Laurel-leaves of Solutrean age; 13, from Le Placard; 14, from Laussel.
15. Small core from North Africa.
16. Core of Middle Aurignacian age from Cro-Magnon.
17. Awl of Azilian age from the Bas-Médoc.
18. Trimmed blade of Upper Aurignacian age from Masnaigre.
19. Notched blade of Lower Aurignacian age from Laussel.
20. Notched blade of Middle Aurignacian age from Laussel.
21. Pierced tooth from a collar from Laugerie Basse.
22. Grooved piece of sandstone for making needles from Laugerie Basse.
23. "Utilised" bone from La Quina (Mousterian age).

PLATE V

PLATE VI. BONE TOOLS, ETC.

No. 5 is copied from a drawing by Conde de la Vega del Sella; No. 23 is from a specimen in the Sedgwick Museum, Cambridge; the others are from specimens in the author's collection. All are of Magdalenian age except Nos. 22 and 41.

Scale: No. 24 is 7·4 ins. in length, others in proportion.

1. Pointed polisher from Laugerie Basse.
2. Ivory single-bevelled point from Liveyre.
3. Awl from Laugerie Basse.
4. Sceptre or *bâton de commandement* from Laugerie Haute. The end by the hole has been partly broken off and lost. There are traces of engraving near the hole.
5. Single-barbed harpoon with the basal notch peculiar to Cantabria, from Cuerto de la Mina (Cantabria, Spain).
6. Awl from Laugerie Basse.
7. Pierced tooth used as an ornament from Laugerie Basse.
8. Eyed needle from Laugerie Basse.
9. Straight fish-hook (i.e. a gorge) from Laugerie Basse.
10. Eyed needle from Laugerie Basse.
11. Large eyed needle from Le Placard.
12. Lance-point from Laugerie Basse.
13. Single-bevelled lance-point from Laugerie Basse.
14. Lance-point from Laugerie Haute.
15. Small lozenge-shaped point from Liveyre.
16. Small tubular bead ornamented with incised parallel lines from Laugerie Basse.
17. Tapering double-bevelled lance-point from Cro-Magnon.
18. Curved stiletto (base broken) in ivory from Cro-Magnon.
19. Single-bevelled lance-point from Laugerie Haute.
20. Polisher from Laugerie Basse.
21. Portion of a wand ornamented with incised parallel lines from La Madeleine.
22. Split base point from La Ferrassie (Aurignacian age).
23. Forked base bone point of Magdalenian age from Gourdan. (Note the sides of the notch are not very divergent, this indicates that the age is Lower Magdalenian rather than Upper Magdalenian.)
24. Polisher showing three short grooves from Liveyre.
25. Single-bevelled point from Laugerie Basse.
26. Double-bevelled point, with incised lines on the bevels, from Laugerie Basse.
27. Single-bevelled point, with incised lines, from Laugerie Basse.
28. Portion of a flat polisher from Laugerie Basse.
29. Pointed base of a harpoon from Laugerie Basse.
30. Fragment of a harpoon from the Grotte Marguerite (Les Eyzies, Dordogne).
31. Double-barbed harpoon from Laugerie Basse (Magdalenian 6 *b*).
32. Portion of a polisher from Le Placard (Lower Magdalenian).
33, 34. Double-barbed harpoons from Laugerie Basse; 33, Magdalenian 6 *b*; 34, Magdalenian 6 *a*.
35. Fragment of a double-barbed harpoon from Laugerie Basse.
36. Single-barbed harpoon from Laugerie Basse (Magdalenian 5).
37. Stiletto from Laugerie Basse.
38. Point showing fine parallel longitudinal grooves from Laugerie Basse.
39. Polisher from Laugerie Haute.
40. Large awl from Laugerie Haute.
41. Small pierced stone used as an ornament from Masnaigre (Aurignacian).
42. Tiny double-bevelled point from Laugerie Basse.

42 A. Ditto showing side view of the double bevel.

R.L. Stanley
June, 1920

PLATE VII. TOOLS.

From specimens in the author's collection.

Scale: No. 4 is 9·7 ins. in length, others in proportion except 5.

1. Cones of percussion produced by a blow.
2. Small polished stone axe.
3. Small Campignian pick from Mesnil St Loup (Aube).
4. Horn arrow-straightener from Liveyre.
5. Pigmy triangles and trapeze. Of Azilio-Tardenoisean and early Neolithic age.
6. Small pointed blade from Grand Pressigny.
7. Flake showing bulb of percussion.
8. Small Neolithic arrow-head.
9. Engraving of the back of a horse from Laugerie Basse (Magdalenian age).
10. Canoe-shaped axe from near the Kelvie hospital, Oban.
11. Rough Neolithic scraper from the surface at Three Hills, Mildenhall.
12. End of a partially polished axe from Grand Pressigny.
13. Polished axe with bevelled sides from Brittany.
14. Small toothed arrow-head from North Africa.
15. Double-pointed blade from Grand Pressigny.
16. Campignian pick from Mesnil St Loup (Aube).
17. Small concave arrow-head from North Africa.

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PLATE VIII. SURFACE INDUSTRIES FROM EAST ANGLIA OF NEOLITHIC TO BRONZE AGE DATE.

Scale: No. 20 is 4·8 ins. in length, others in proportion.

1. From Croxton. Patina bluish. Chipped all over. A fabricator.
2. From Kenny Hill. Patina white. Chipped all over. A fabricator.
3. From West Tofts. Patina bluish. A pointed flake.
4. From Tuddenham. Patina white. A pointed flake. Made in this particular case from a portion of an older tool.

5, 6. From Icklingham; 5, patina grey-glassy. A fine fabricator; 6, a double-ended pointed scraper on trimmed blade.

7. From Eriswell. Patina black. Awl.
8. From Eriswell. Patina white. A small convex-edge chisel. The pointed end was probably hafted either into a split stick or into the end of a bone. That these tools are really chisels has been denied, but the fact that the convex edge is sharp and often shows signs of use would suggest that they are really chisels.
9. From Lakenheath Warren. Patina grey, lustrous. A chisel chipped all over, flat on one side and arched on the other.
10. From Coton (near Cambridge). Patina greenish. A polished axe.
11. From Burnt Fen. Patina grey. A thin leaf-like arrow or lance-head.
12. From Undley. Patina brown. A thin leaf-like arrow or lance-head.
13. From Lakenheath. Patina clear. A thin leaf-like arrow or lance-head.
14. From Quy. Patina grey. A thin leaf-like arrow or lance-head.
15. From Icklingham. Patina grey-black. A large leaf-shaped lance-head.
16. From Western Ditch (Suffolk). Patina grey-black. A slug. The under surface is the flat flake surface.
17. From Mildenhall. Patina brown. A chisel-end slug.

18, 19. From Cavenham; 18, patina bluish. Notches; 19, patina bluish. A core scraper.

20. From Eriswell. Large blackish fabricator or early Neolithic pick.
21. From Icklingham. Black. A tortoise core.
22. From Soham Fen. Patina yellow dull. A tanged arrow head with 2 wings.
23. From Quy. Patina grey. A tanged arrow head with 2 wings.
24. From Burnt Fen. Patina blackish. A tanged arrow head with 2 wings.
25. From Kenny Hill. Greyish barbed arrow point.
26. From Fordham. Greyish barbed arrow point.
27. From Kenny Hill. Arrow head with a concave base.

28, 29. From Cavenham; 28, patina bluish. Notch on the end of a flake; 29, a black flat core-scraper.

30. From Lackford. A black core-scraper.
31. From Undley. Patina chocolate. A nose end-scraper on a blade with trimmed edges and without a facetted butt.
32. From West Stow. Black nose end-scraper on a blade without trimmed edges and without a facetted butt.
33. From Ingham. Black nose end-scraper on a blade with slightly trimmed edges and without a facetted butt.
34. From Icklingham. Black nose end-scraper on a blade with one edge trimmed and without a facetted butt.
35. From Mildenhall. Patina yellowish. A large round scraper.
36. From Tuddenham. Black scraper on a round flake trimmed all round.
37. From Brandon. Patina bluish. A round scraper.
38. From Icklingham. Black square-angled flat disc.
39. From Kenny Hill. Patina white, lustrous. A pointed knife blade with a blunted back near the pointed end. This type is not common and may be of Azilio-Tardenoisean age.

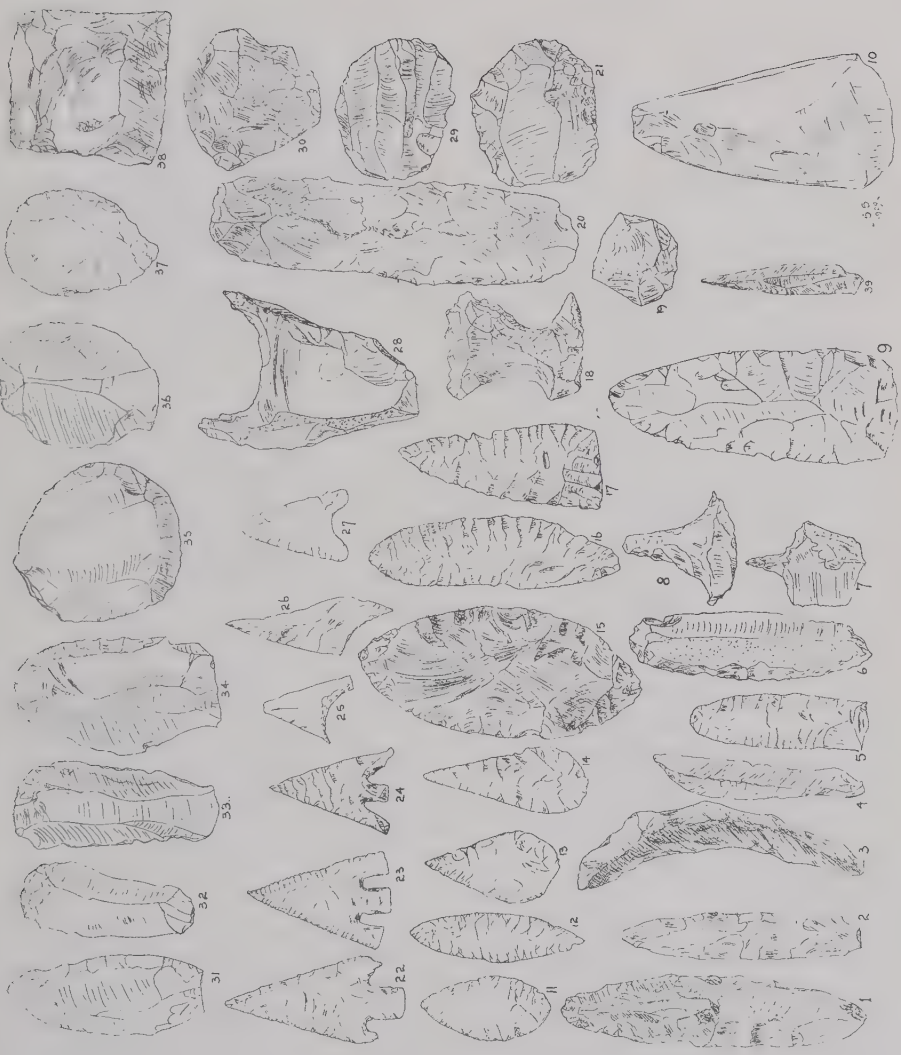


PLATE IX. PHASE 1 (ENGRAVINGS).

After tracings by Breuil.

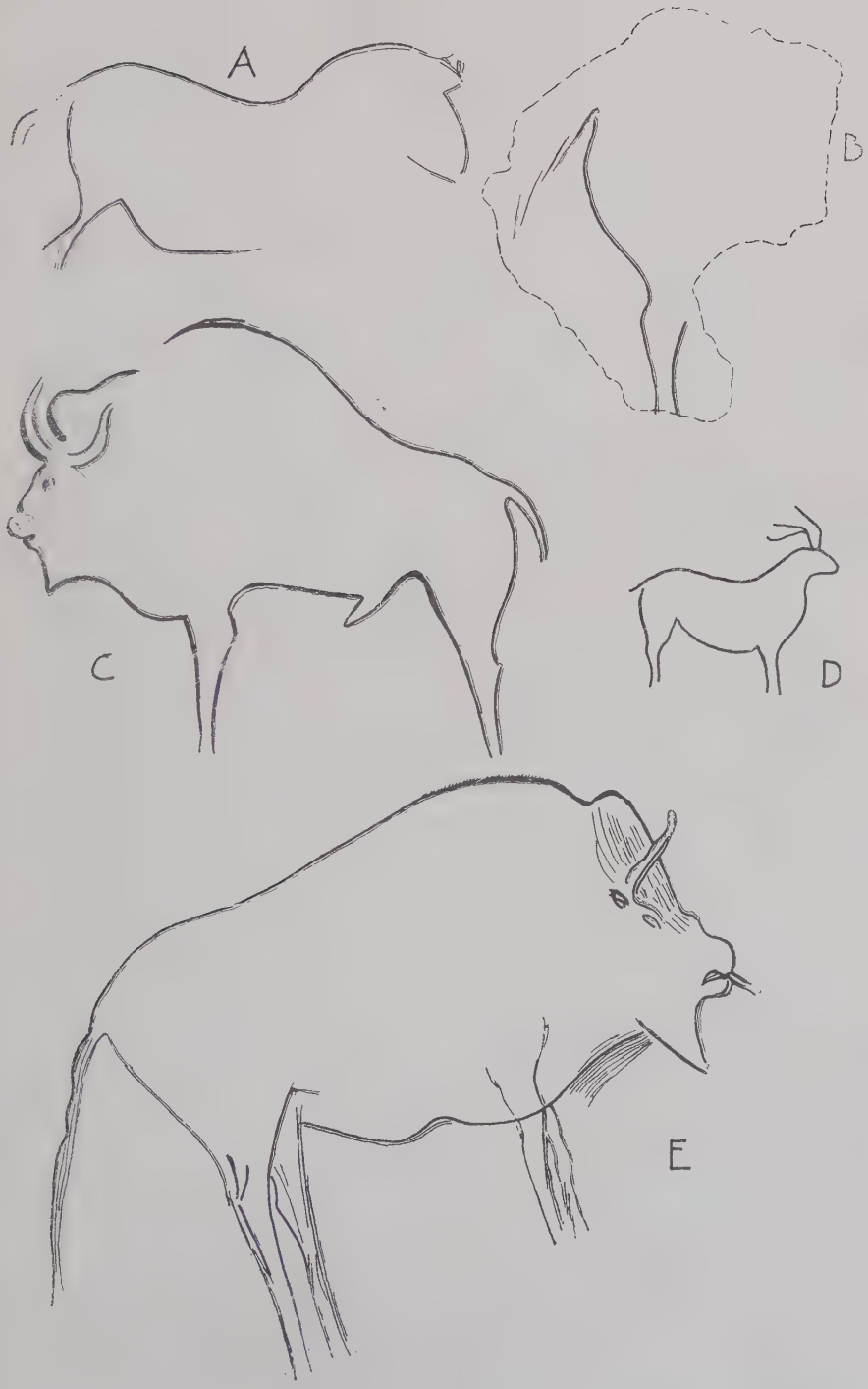
A. Engraving of a horse on the left wall of the vestibule at Hornos de la Peña (Cantabria). Note the deep, vigorous outline. It is as if the shadow of the animal had been projected on to the cave wall and then an outline drawn round it. In this example no eye is indicated, but this is not always the case even in this primitive phase. When it is shown it is generally almond-shaped. On the other hand in the later phases it is usually round. For a proof of the Aurignacian age of this engraving and so incidentally for phase 1, see the next drawing, *B*.

B. Engraving on bone of the hindquarters of a horse from the Lower Aurignacian layer of the deposit at Hornos de la Peña (Cantabria). Note the exact similarity to the engraved horse from the same place that has just been described. The same deep, vigorous outline is seen and the one might almost be the sketch for the other. The engraved bone is dated, coming as it does from the deposits. Therefore it can be safely assumed that the horse engraved on the walls of the same cave only a few yards away is also of Aurignacian age.

C. Engraved bison from the little cave of La Grèze (Dordogne). La Grèze is only a few kilometres from Les Eyzies and opens on the right-hand side of the valley just below Cap Blanc. The engraving is low down near the floor of the cave and was completely covered by deposits containing Solutrean implements. The style is deep and vigorous as in the case of *A* and *B*. It must be older than the Solutrean which covered it and its style agrees with an Aurignacian age.

D. Engraved reindeer (?) or ibex (?) from Pair-non-Pair (Gironde). Pair-non-Pair is the small cave that was completely filled by undisturbed dateable deposits. The engravings on the walls were only discovered as the cave was being dug out. It must be of early Aurignacian age as the covering deposits contained Upper Aurignacian implements. The style is very primitive.

E. Engraving of a bison from Hornos de la Peña (Cantabria). The style is much more advanced and all four legs of the animal are shown. It is still, however, of phase 1, but dates from the end of it. It would therefore be of Upper Aurignacian age. The eye is still almond-shaped and not round. It is 1 ft. 11½ ins. in length.


A
B
C
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E

PLATE X. PHASE 1 (MAINLY PAINTINGS).

After tracings by Breuil.

A. Engraved meanders or "macaroni" from Hornos de la Peña (Cantabria). These meanders are the first manifestations of art. They were probably made at first with the fingers on the soft clayey wall of a cave; then later with a pronged instrument. Note however that the various lines are not here all parallel, as would be the case if a rigid pronged tool were used. Some have thought that Man saw the marks made by cave bears in sharpening their claws and tried to copy them. These scratches made by bears in caves while sharpening their claws are common and are sometimes cut by the early Palaeolithic paintings.

B. Similar meanders, but painted, from La Pileta (South Spain).

C. Painted ibex and chamois from La Pasiega. In these cases the two front legs are represented but without perspective as is also the case with the horns. Often examples of this phase show only one back and front leg. Note the upright horns of the chamois that are so typical of this animal. The ibex is of the end of the phase or even of the next phase.

D. Primitive painted heads of an ox and a hind from Castillo (Cantabria).

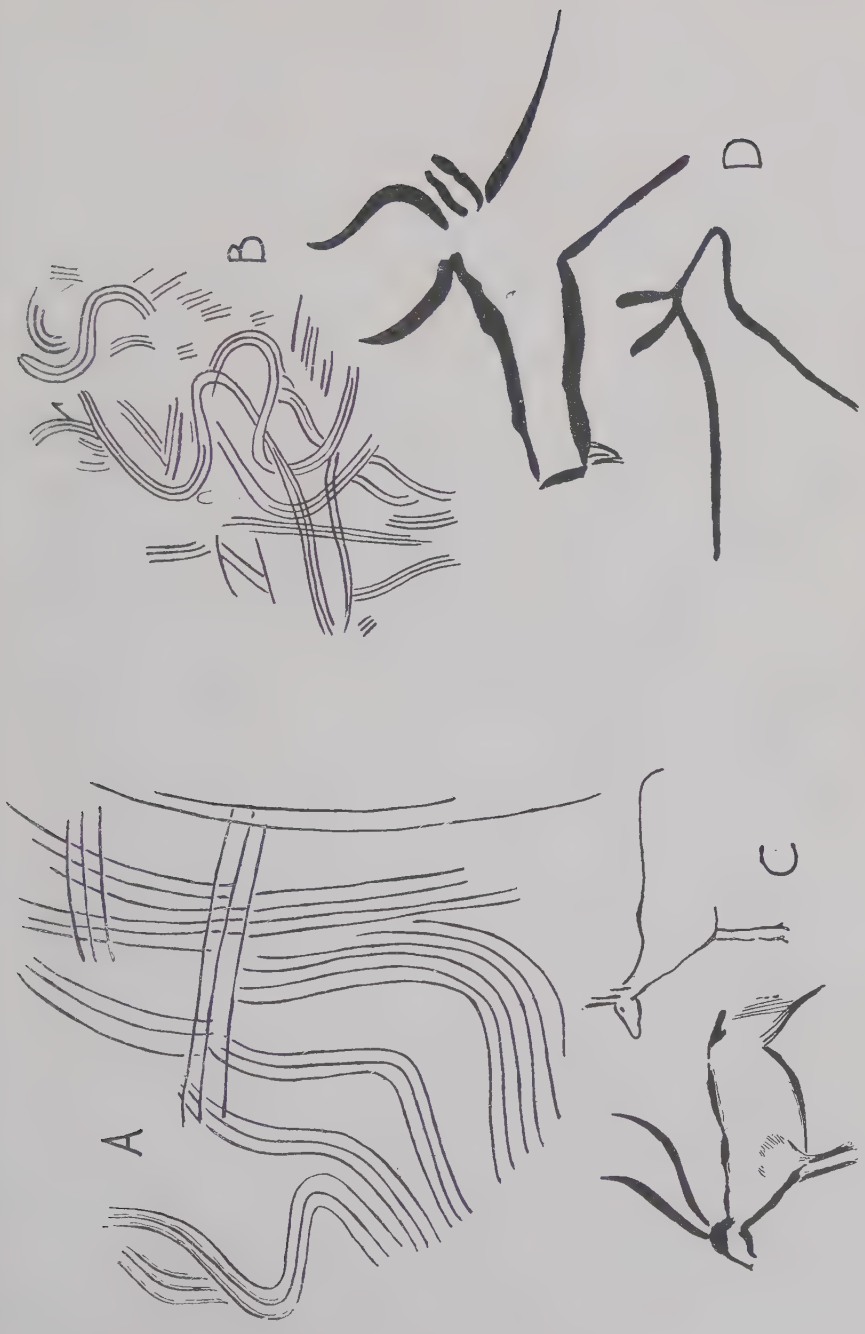

A
B
C
D

PLATE XI. PHASE 2 (ENGRAVINGS).

After tracings by Breuil.

A. Engravings of a feline, a bear, and a mammoth, from the cave of Combarelles (Dordogne). Note that the figures are bold and vigorous, and unlike the Aurignacian engravings of phase 1 there is no longer merely an outline with perhaps an eye put in afterwards. The various parts of the animal are here finished as the artist goes along. In other words the artist sees the projection of the animal on the cave wall and not merely an outline.

B. Engraving of a hind's head at Castillo (Cantabria). Below is an engraving on bone of the same species of animal. This latter was found in the Lower Magdalenian deposits at Castillo. The style of engraving, peculiar to the district, is exactly similar in the two cases. The age of the engraving on the bone being known the other engraving on the wall of the cave behind must be of the same age. Bones engraved in the same style have been dug up from the Magdalenian deposits at Altamira.

C. Engraving of a horse from the cave of La Pasiega (Cantabria). Note that the style is not far different from that of *B*.

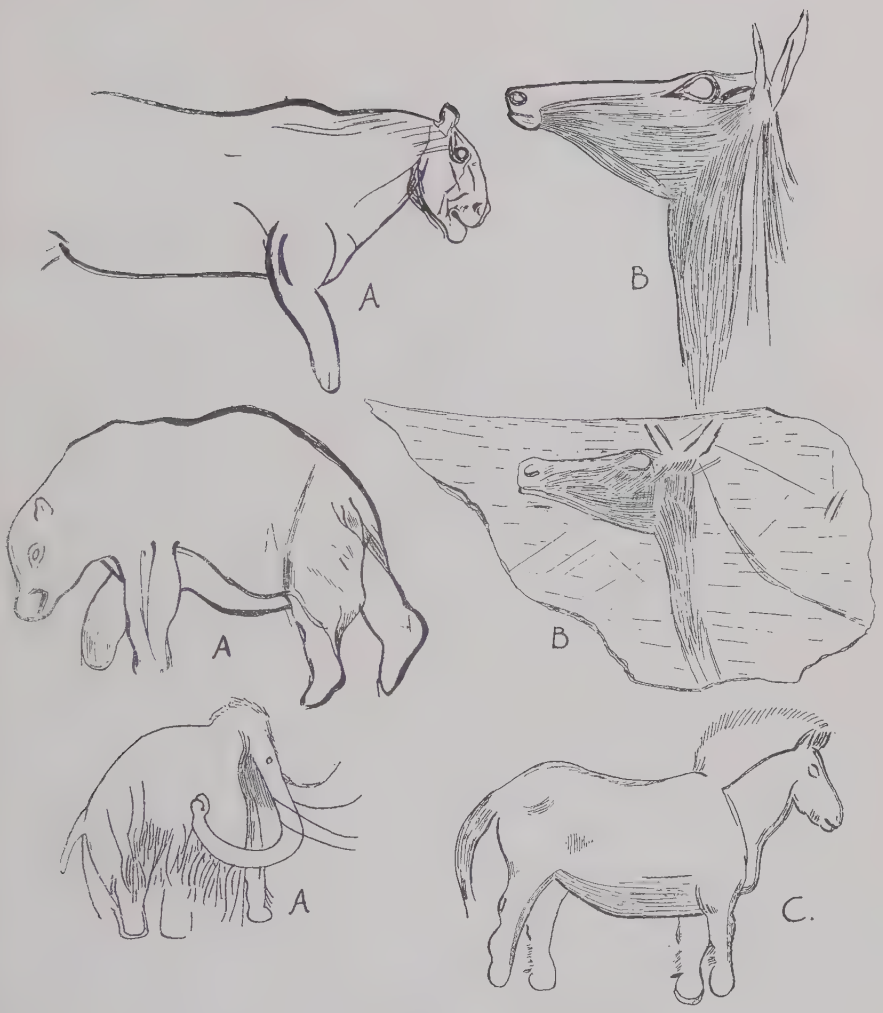

A
B
A
B
A
C.

PLATE XII. PHASE 2 (PAINTINGS).

After tracings by Breuil.

Figure of a bison in stump drawing from Altamira (Cantabria). The conventionalised human hand above is of quite a different age. This is perhaps the most vigorous period in the Palaeolithic art. There was a little engraving done at the neck as well. The bison is nearly 3 ft. in length.

Figures of hinds in the punctuation style from Covalanas (Cantabria). This style is probably a little earlier than the stump drawings and hardly occurs in France.

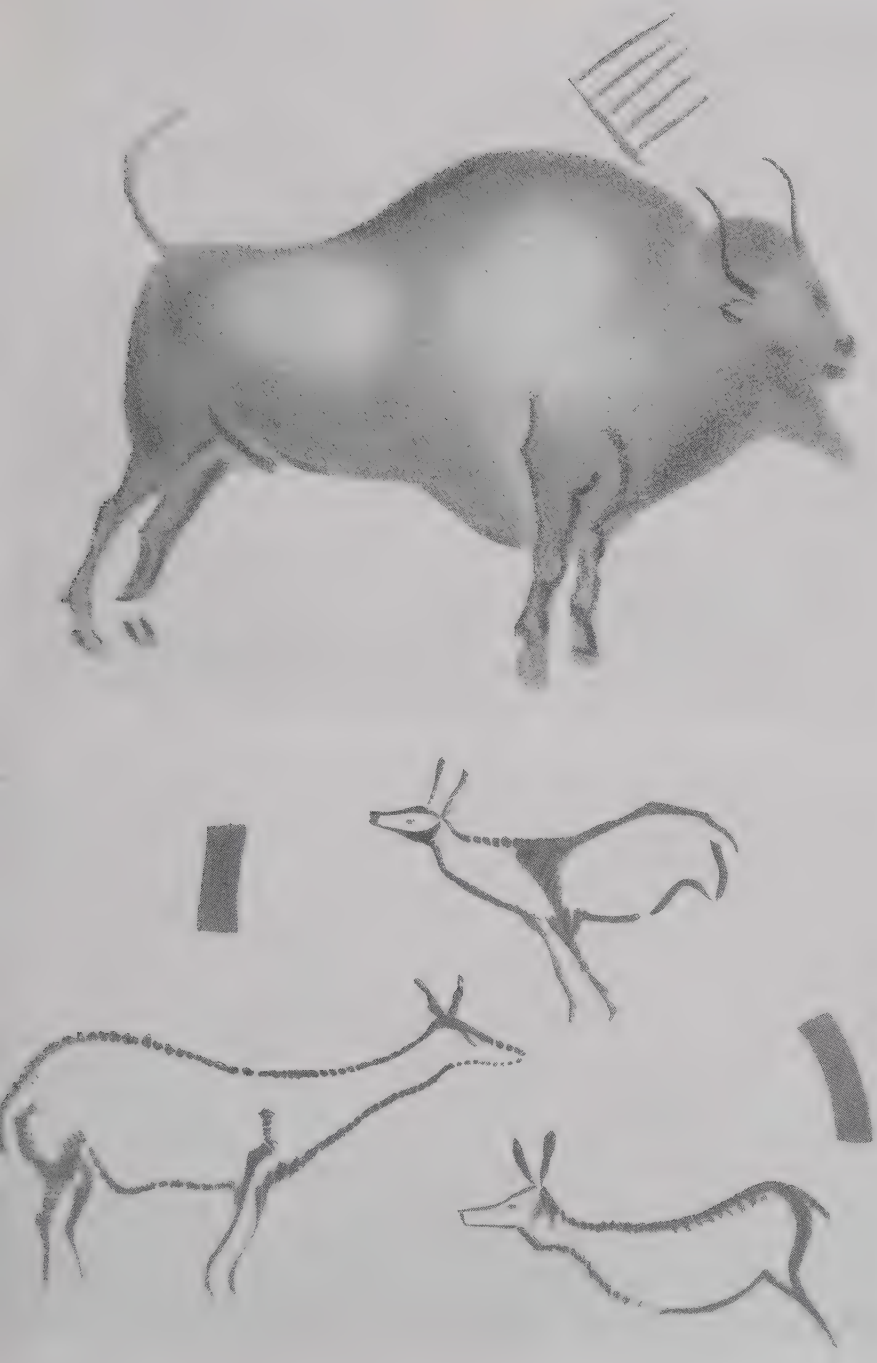
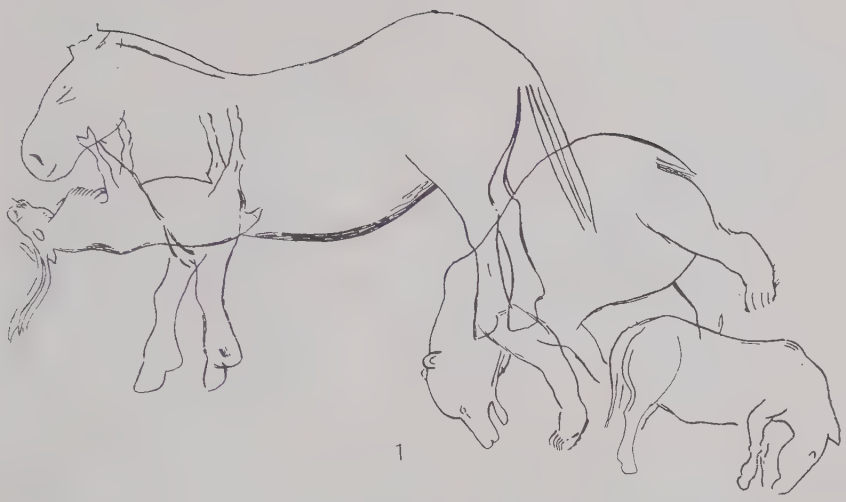


PLATE XIII. PHASE 3 (ENGRAVINGS).

After tracings by Breuil.

1. Engravings on a large block of stalagmite in the cave at Teyjat (Dordogne). Note the presence of horse, reindeer and cave bear.
2. Engravings on a large block of stalagmite in the cave at Teyjat (Dordogne). Ox following a cow. Actually in the cave three animals are figured following one another. The larger here is about 1 ft. 9 ins. in length.
3. Group of oxen from La Loja (Cantabria).

   Note the queer way the horns are represented in several of the figures.



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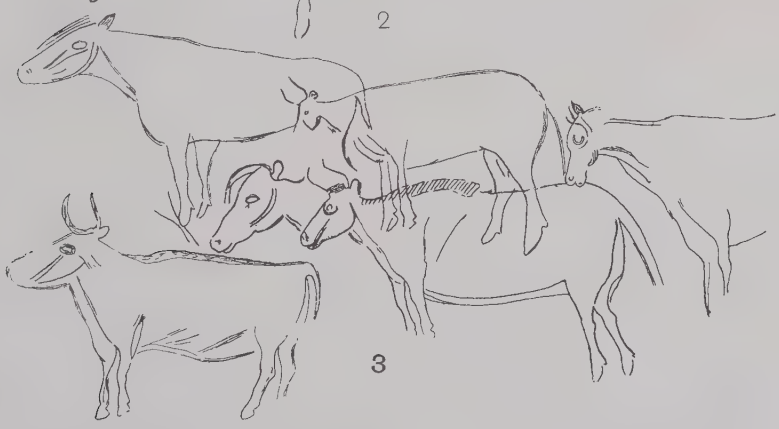

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PLATE XIV. PHASE 3 (PAINTINGS, FLAT WASH).

After tracings by Breuil.

A. Three hinds painted in red from La Pasiega (Cantabria). Note one is looking backwards, a rare occurrence in Palaeolithic art.

B. An ox and a horse painted in black from Font-de-Gaume (Dordogne). Note that the difference in the hoof is shown even in this inferior flat wash style.

C. Two horses painted in red from Altamira (Cantabria).

D. Coarse outline associated with engraving from Pindal (Cantabria). Note the arrow painted on the flank of the bison.

E. Coarse outline painting of a horse from Altamira (Cantabria).

A
A
B
A
B
C
C
D
E

PLATE XV. PHASE 4 (ENGRAVINGS).

Three mammoth from the cave of Font-de-Gaume (near Les Eyzies, Dordogne). In this phase engravings have degenerated into mere scratches. No longer do we find a vigorous outline. In fact parts of the animal, such as the feet, are merely indicated. In a sense it is almost the beginning of an impressionist school. The hair of the mammoth is well shown and there is no doubt of the identity of the animal. These fourth phase engravings from Font-de-Gaume are found engraved over the polychrome paintings. They are therefore, if anything, newer than the polychrome art. The difference in age is probably not great however.

PLATE XVI. PHASE 4 (PAINTINGS).

After tracings by Breuil.

Polychrome picture of a reindeer from Font-de-Gaume (Dordogne). Here and there engraving is to be found with the painting.

Polychrome picture of a bison from Altamira (Cantabria).

Note that the vigorousness of the stump paintings of phase 2, which was lost in the flat-wash period, is regained by the help of polychrome to some extent.

PLATE XVII. HUMAN HAND.

A and *C* after Breuil; *B* after a tracing made by the author.

A. Human hands mutilated by the removal of one or more joints from one or more fingers, which are found painted on the walls of the cave Gargas, near the village of Aventignan some few miles from Montréjeau. The entrance to Gargas became blocked up at the end of Upper Aurignacian times. This is proved by the number of boulders of limestone that fell into the top—Upper Aurignacian—deposit of the cave. The cave was only rediscovered and opened up in recent times. The question of the mutilated hands has been dealt with in the text. It is sufficient here to remind the student that no artist would be likely to decorate his home with mutilated hands for ornament nor would he do it for *joie de vivre*. The hands at Gargas are negative hands, i.e. the hand was placed on the wall and the colour then applied. This leaves the part covered by the hand uncoloured while the wall around was coloured. The majority are left hands, though right hands occur.

B. Negative hand in red at Castillo. None of the hands at Castillo are mutilated.

C and *D*. Conventionalised hands from the cave of Santian (Cantabria). A frieze of these paintings is the only occurrence of art in this cave. The age is therefore only determined by analogy with hands elsewhere. If these figures are really meant for hands then the age is probably early Aurignacian as all the other hands belong to this date, except some very conventionalised examples.

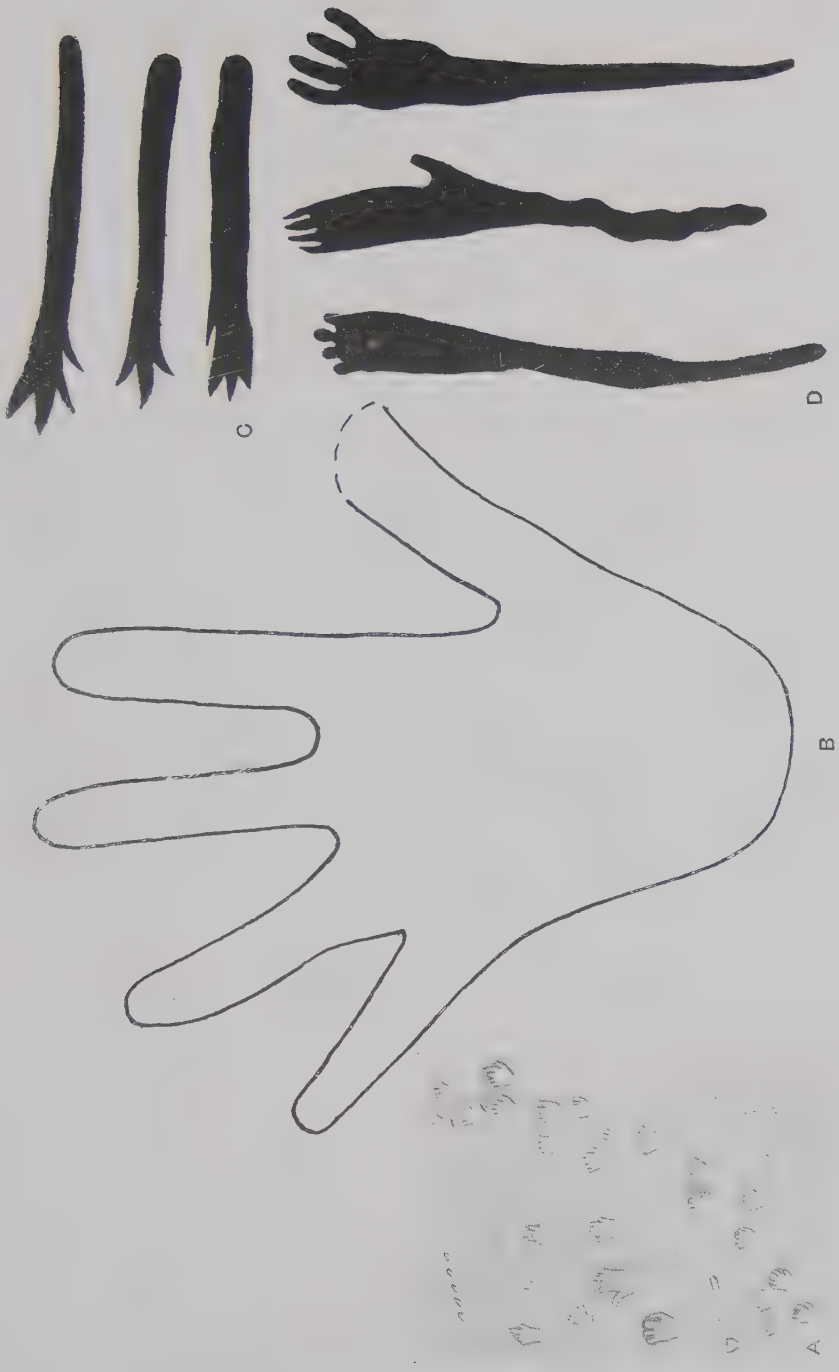

C
D
B
A

PLATE XVIII. EXAMPLES OF THE CAVE ART.

After tracings by Breuil.

A. An elephant (probably *Elephas antiquus* owing to its short straight tusk) from Castillo (Cantabria). The style is of phase 1.

B. Birds from the cave of El Pendo (Cantabria). The style is of phase 3. Note that birds are exceedingly rare in Palaeolithic art.

C. Two oxen from the cave of La Clotilde san Isabel (Cantabria). The style is very primitive and the figures have been made with the finger on the clay walls of the cave.

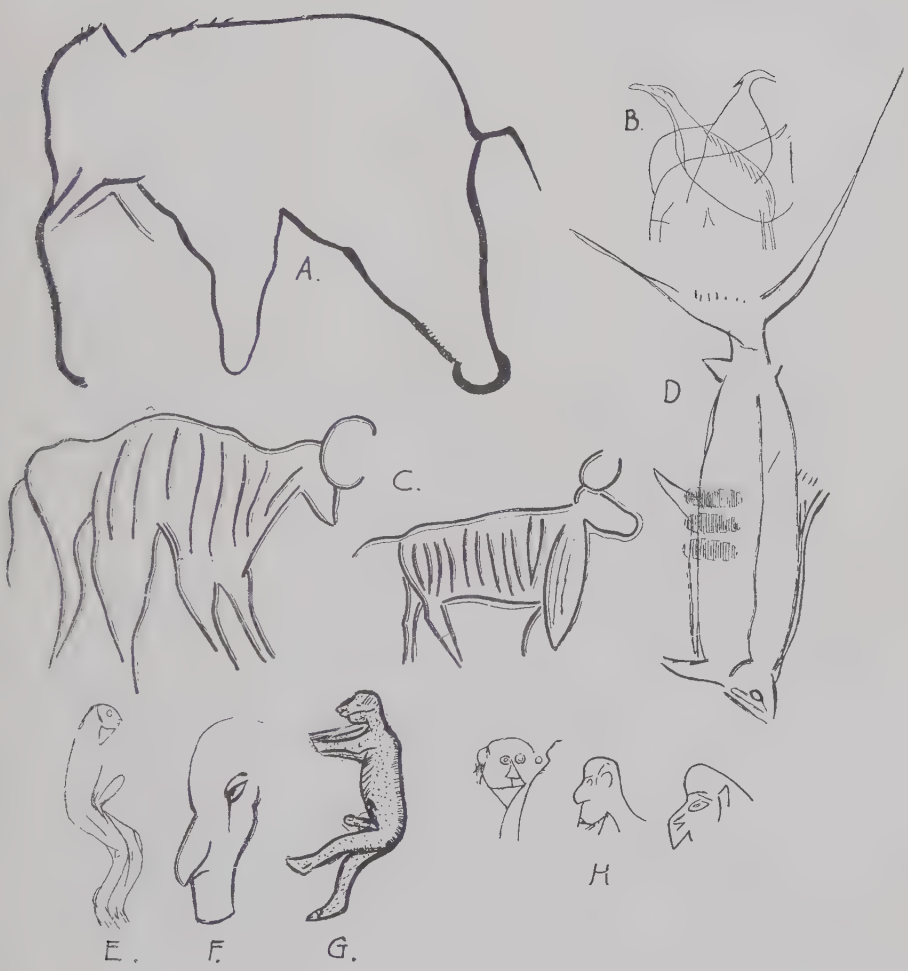
D. Engraved fish from Pindal (Cantabria) of the third phase.

E. Primitive engraving of a human being from the ceiling of the main chamber at Altamira (Cantabria).

F. Human head from the cave of Marsoulas (Ht. Garonne).

G. Human being engraved on bone from the deposits at Mas d'Azil (Ariège).

H. Human heads from the cave of Marsoulas (Ht. Garonne).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G.
H

PLATE XIX. EXAMPLES OF THE CAVE ART.

A and *B* after tracings by Breuil; *C* after a drawing made for the author by an Australian friend.

A. A sculpture of a horse in high relief from the frieze at Cap Blanc (Dordogne). The end of the horse's muzzle is still buried in the deposits that covered the whole frieze until it was dug away by Dr Lalanne of Bordeaux. The covering deposit can be dated from its contents and is of Lower Magdalenian, M. 3 age. The frieze then must be a little older (M. 1 or 2?). The style is of phase 2. It is about 7 feet in length.

B. Sculptured horse's head in high relief from the cave of Comarque (opposite Cap Blanc). The age and style is similar to the frieze at Cap Blanc.

C. Bison painted in black from the cave of Portel (Ariège). The age would seem to be Lower to Middle Magdalenian judging from the style which is of phase 1 to 2. The artist engraved parts of the bison first of all and then painted on the top. A small deposit at Portel contained *contour découpé* of M. 2–3 age.

A
B
C

PLATE XX. EXAMPLES OF THE CAVE ART.

After tracings by Breuil.

A. Tectiforms covered by red barbed lines of Azilian age from Marsoulas (Ht. Garonne).

B. Engraving of the front of a bison from Marsoulas (Ht. Garonne).

C. Three bisons from Marsoulas (Ht. Garonne), two showing stippling. The stippling is perhaps an evolution from the punctuation style of phase 2 in Cantabria.

D. Engraved horse of the third phase from Marsoulas (Ht. Garonne). Note how the body is covered with lines. This is common in third phase engravings.

E. Engraved hind of the third phase from Altamira (Cantabria).

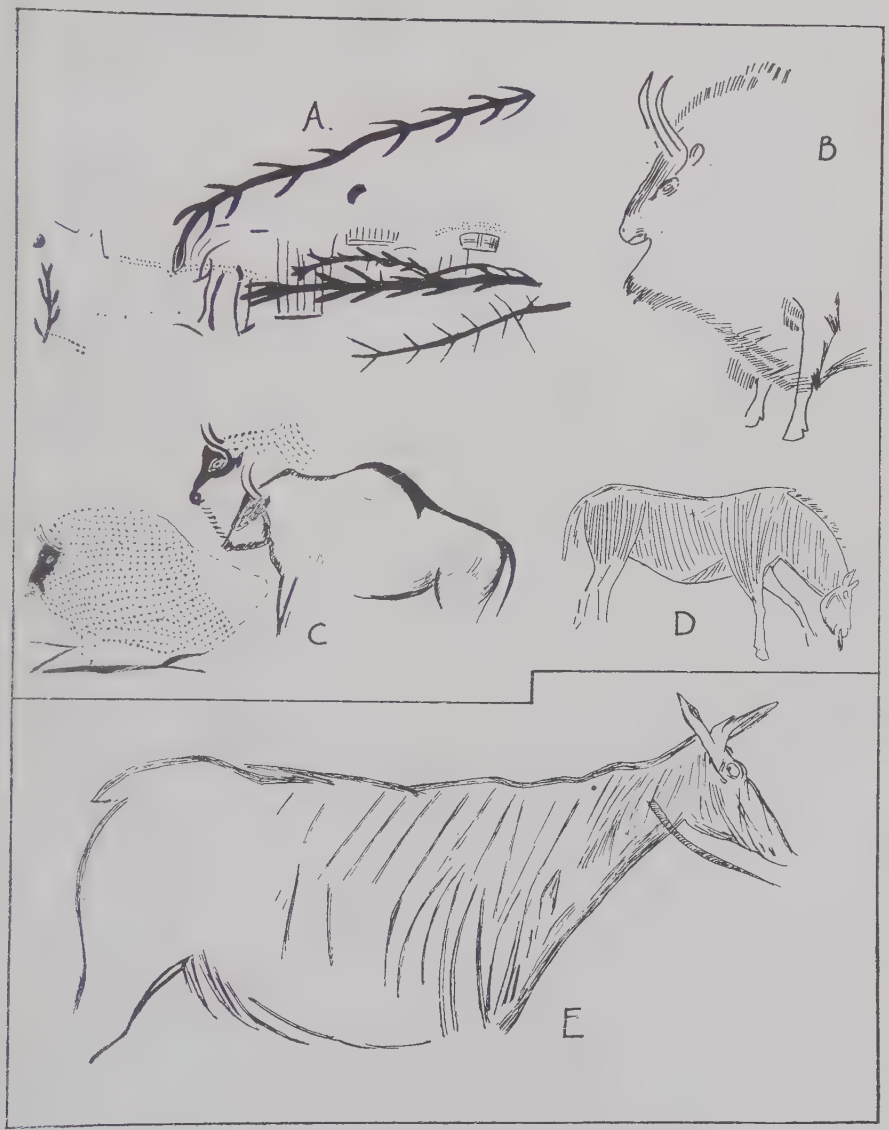
A.
B
C
D
E

PLATE XXI. EXAMPLES OF THE CAVE ART.

After tracings by Breuil.

A. Bison painted in black showing arrows in its side from Niaux (Ariège).

B. Bison engraved on the floor of Niaux (Ariège), showing three wound holes, being three natural holes indicated by arrows (see text).

C. Fish engraved on the floor from Niaux (Ariège). Representations of fish are very rare in Palaeolithic art.

D. Painted bison, the back of which is formed by a natural hollow in the rock. To the right are club-like signs and punctuations. Note the rings of punctuations with one point in the middle. From Niaux.

E. Ibex painted in black from Niaux (Ariège).

F. Rhinoceros painted in red from Font-de-Gaume (Dordogne). Probably of phase 1.

G. Wolf painted in polychrome from Font-de-Gaume (Dordogne).

A
B
C
D
E
F
G

PLATE XXII. EXAMPLES OF THE CAVE ART.

After tracings by Breuil.

Two bisons, a horse and an ibex from the cave of Niaux (Ariège). All four figures are painted in black and the arrow in the side of one of the bisons should be noted. This was no doubt added for magic purposes. The figures are several feet in length.

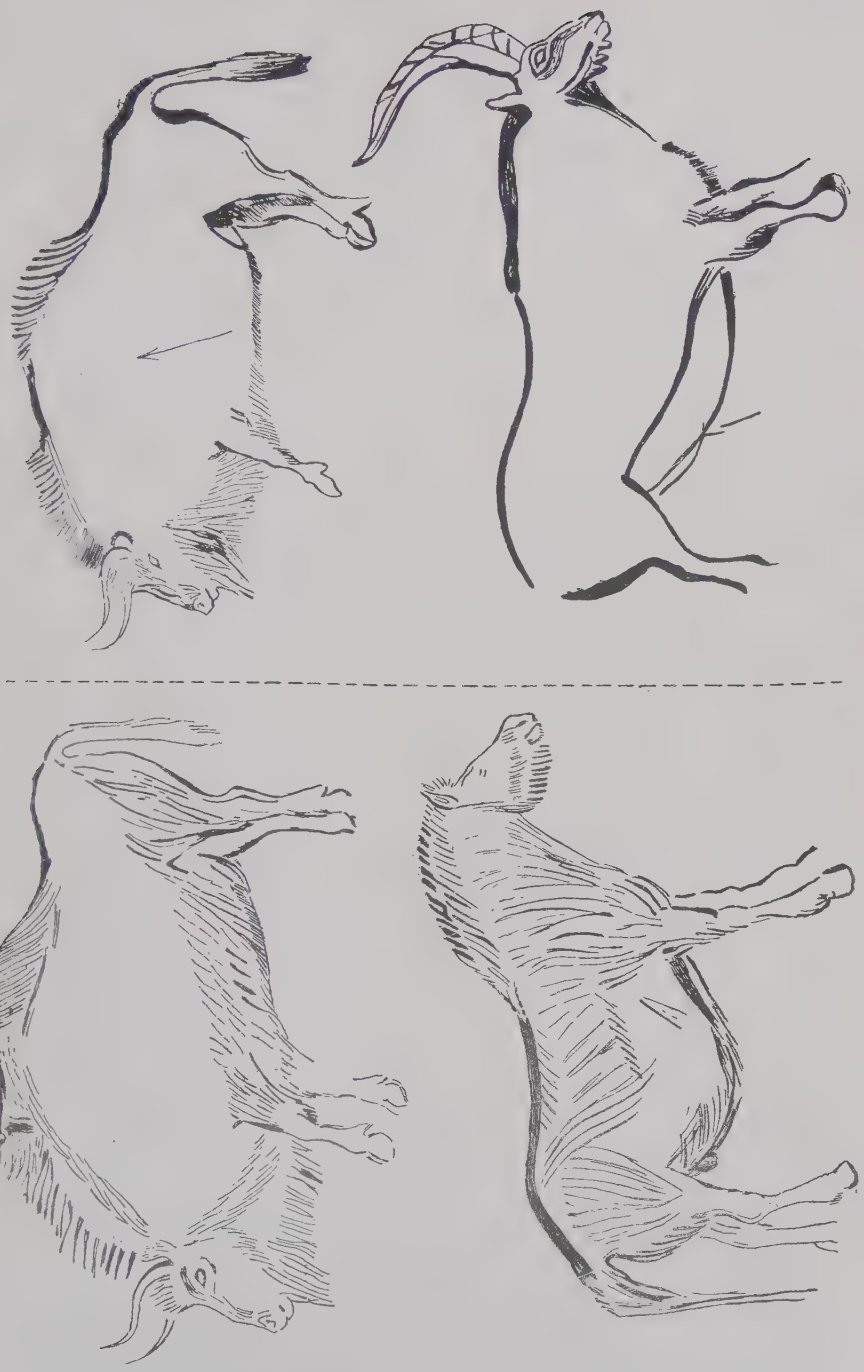

PLATE XXIII. ILLUSTRATION OF THE ART AT LA PILETA (SOUTH SPAIN).

After tracings by Breuil.

Note that the painting to the right must be meant for a bison although the head is missing. No other animal has such a characteristic humped back. The figures to the left show the early type (series 1); the bison is slightly later of series 2; while the black thick outline painting in the middle is of series 3. Note the general similarity to the Palaeolithic art of the North.

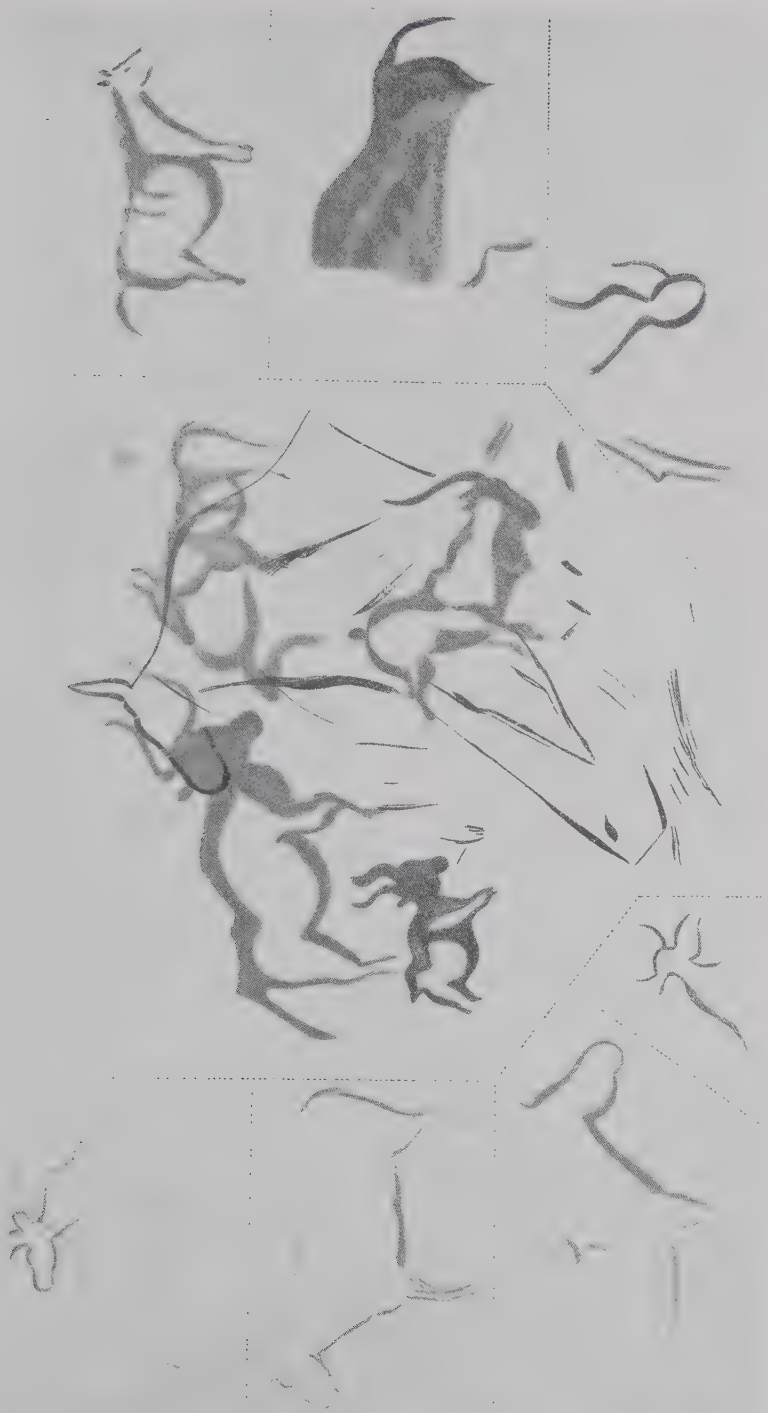

PLATE XXIV. CAVE ART, TUC D'AUDOUBERT.

The upper illustration from a photograph taken by Count Begouen, the lower from a photograph by the author.

The two bisons modelled in clay from the end of the cave Tuc d'Audoubert. The front figure is the female which is followed by the male.

The entrance to the Tuc d'Audoubert, necessitating a boat. The figure to the right is the portrait of Monsieur Cartailhac of Toulouse; to the left that of Comte Begouen.

PLATE XXV. EXAMPLES OF THE CAVE ART.

After photographs by the author.

A. Two bisons from Niaux. The top one is facing from left to right and the lower from right to left. They are painted in black and measure several feet in length.

B. An engraved bison from Portel. The figure is somewhat over a foot in length. Phase 2.

C. An engraving of a reindeer rather more than two feet in length from the Combarelles. It is facing from right to left. Phase 2.

D. The sculptured fish in relief from a little rock shelter in the Gorge d'Enfer (Les Eyzies). The Germans tried to remove the fish bodily to Germany and that is the reason the figure is seen on an isolated block that has been chiselled round. Fortunately it was discovered in time and the fish was declared a National Monument and therefore irremovable from France. Phase 2, similar to the frieze at Cap Blanc.

E. An engraving of a reindeer's head from La Mouthe. It is facing from right to left and the artist has figured a dewlap. Phase 2.

F. The painted tectiform from La Mouthe. This figure is at the end of an alcove, filled with engravings, that leads off from the main passage. It makes one somehow think of a skin-curtain concealing something beyond. Was this a very magic spot?

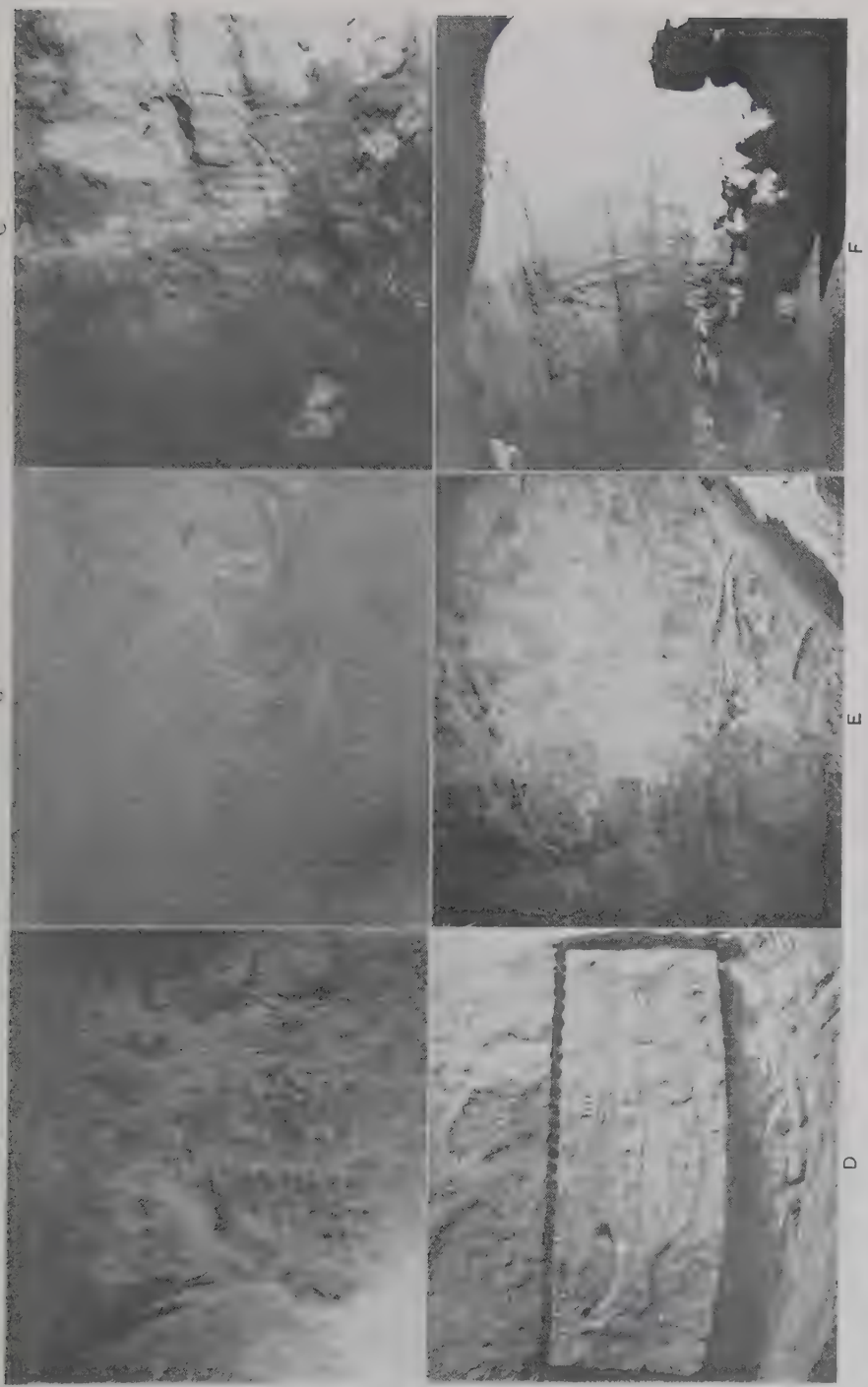
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PLATE XXVI. TECTIFORMS AND THE CONVENTIONAL WOMAN FROM PŘEDMOST.

1 after Obermaier; the others after Breuil.

1. Conventionalised woman from Předmost (Moravia). This engraving seems to be associated with Solutrean implements, but the culture is more probably that of the Upper Aurignacians. It is to be connected with the developing Eastern focus of Upper Palaeolithic culture rather than with France.

2–14. These are examples of the so-called tectiforms. The orthodox view is that they are meant to represent constructions, probably tents. It has been suggested that they were painted in the remotest places in the caves as being the homes of spirits, perhaps of the departed chiefs. Others have suggested that some at any rate of the tectiforms represent traps, i.e. pits dug in the ground and covered with boughs, into which it was hoped game would fall.

2. Tectiform from the cave of Buxu (Asturias, North Spain).

3. Tectiform from the cave of Castillo (Cantabria).

4. Tectiform from the cave of La Pileta (South Spain). It is in the red series.

5. Tectiform from the cave of Castillo. This shield-shaped form is probably an early one.

6. Tectiform from the cave of Font-de-Gaume (Dordogne).

7. Tectiform from the cave of La Pileta (South Spain).

8. Tectiform from the cave of La Pasiega (near Castillo). Note the little triangular piece on the top that has been thought to represent a ridge pole of a tent.

9. Tectiform from the cave of Castillo.

10. Tectiform from the cave of La Pileta. It is suggested that a trap is meant, into which animals, whose footmarks are shown, are being driven.

11. Tectiform from the cave of La Pasiega.

12. Tectiform from the cave of Font-de-Gaume (Dordogne). Again note a supposed ridge pole.

13. Tectiform from the cave of La Pasiega. It is to be found close to what was the ancient entrance to the cave and may be a kind of inscription. For example, some form of prohibition except to the initiated?

14. Tectiform from the cave of La Pileta. It has been suggested that this figure represents a building built on piles which are here shown as rays.

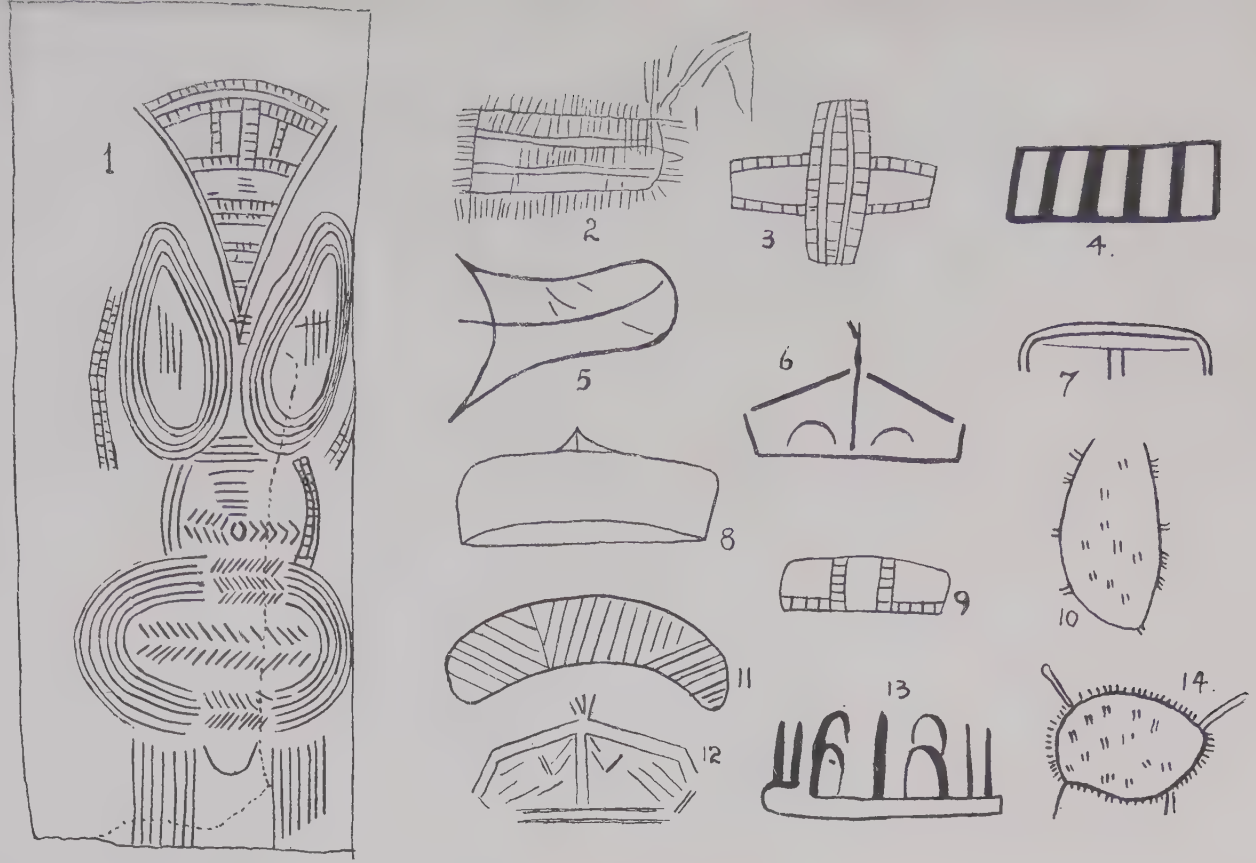

PLATE XXVI

PLATE XXVII. *ART MOBILIER.*

A. Rhinoceros engraved on a pebble from La Colombière. (Upper Aurignacian untouched by Solutrean, which was developing alongside in France.) (After Mayet.)

B. Reindeer turning its head on a flat piece of limestone from Laugerie Basse (in the author's collection).

C. Round plaque with a hole in the middle, engraved with rays, made of bone from Laugerie Basse (Magdalenian 4). (After Breuil.)

D. Roebuck from Lorthet (engraved). (After Breuil.)

E. Engraving on bone from the Grotte des Fées, Marcamps (Gironde) (Magd. 3). (After Breuil.)

F. Pig painted in polychrome on the ceiling at Altamira (Cantabria). (After Breuil.)

G. Stag engraved on the walls at Altamira (Cantabria). (After Breuil.)

H. Musk-ox engraved on a pebble from La Colombière. (Continued development of Upper Aurignacian untouched by Solutrean, which was developing alongside in France?) (After Mayet.)

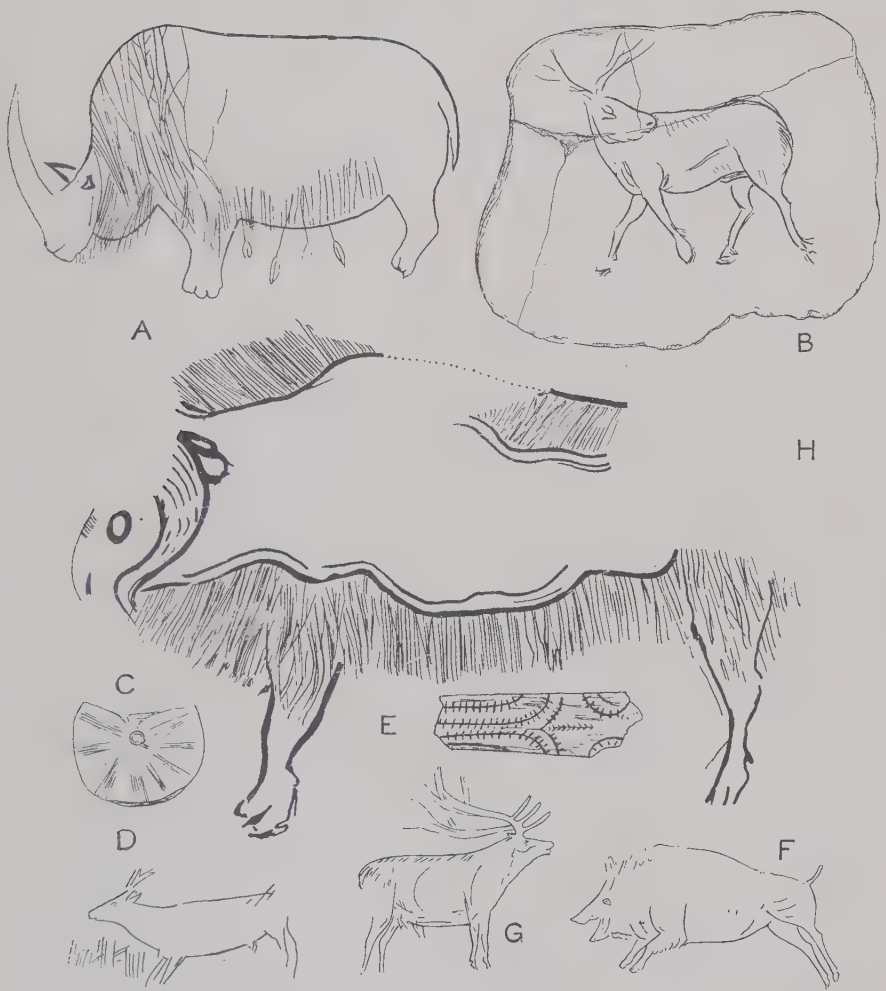
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PLATE XXVIII. *ART MOBILIER.*

A. Back and front of a bone in the possession of the author from Laugerie Basse (Dordogne). The one side bears the engraving of a horse's head, probably of Upper Magdalenian age (M. 6). The other side shows a poorly made engraving of the head of a feline. It would seem that there had been a frieze of these feline's heads, but only a broken portion of the bone is remaining.

B. The pierced amulet (?) comes from Liveyre (Dordogne). It is of schist and is in the possession of the author. On one side there are the engravings of a bison's head, an ibex's head and a reindeer's head (poor). On the opposite side (upper left-hand picture) there is a reindeer figured.

B

A

PLATE XXIX. HUMANS.

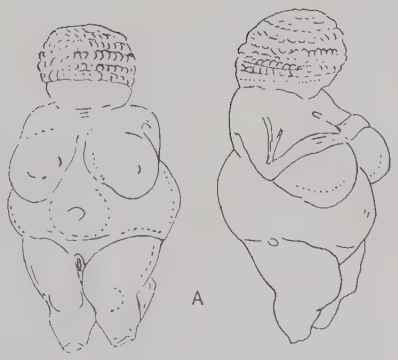
After Dr Obermaier.

A. The "Venus of Willendorf" (Lower Austria). It is sculptured out of a fine oolite limestone. It is of Upper Aurignacian age.

B. The "Venus of Brassempouy" (Landes, France). Carved out of mammoth ivory. It is of early Aurignacian age. It was the finding of this and similar carvings that misled M. Piette, who considered that they must be of Magdalenian age.

C and *D*. Statuette in steatite from Mentone of Upper Aurignacian age.

E and *F*. Sculptures in relief on blocks of limestone of a woman with a bison's horn in her hand and a hunter whose head has disappeared. These sculptures were dug up at Laussel (Dordogne). They were found in a layer with Gravette points and are therefore of Upper Aurignacian age.



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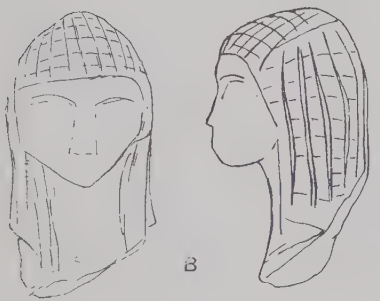

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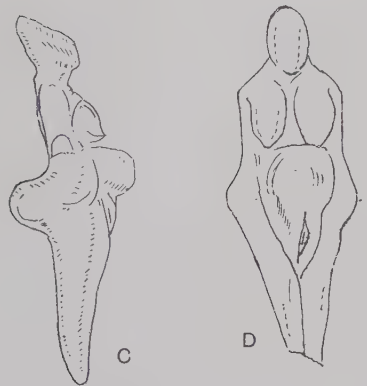

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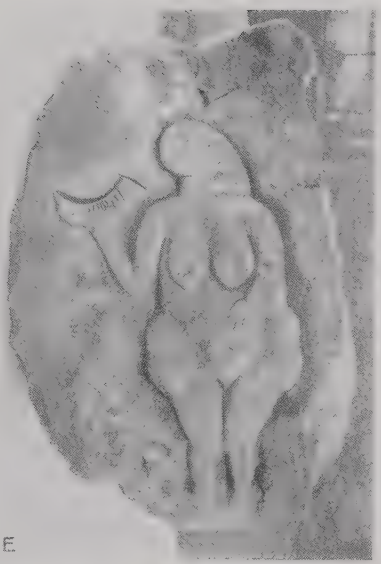

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PLATE XXX. *ART MOBILIER.*

After Breuil.

A. Horse engraved on a "sceptre" found at l'Abri Mège. Age, Magd. 5.

B. Human figures masked as chamois engraved on the same sceptre as the above.

C. Herd of reindeer, some only being indicated by their horns, from the deposit at Teyjat (Dordogne).

D, E. Zig-zag lines cut by transverse lines engraved on bones from Altamira (Cantabria). Magd. 3.

F. Engraving of a saiga from Gourdan (Ht. Garonne). Magd. 4–5.

G. Engraving of a chamois from Gourdan (Ht. Garonne). Magd. 4–5.

H. Engraving of a rhinoceros from the Trilobite (Yonne). Aurignacian age.

I. Engraving of a rhinoceros from Gourdan (Ht. Garonne). Magd. 4–5.

J, K. Spiral decorations from Arudy (Basses Pyrénées). Magd. 3.

L. Sceptre with raised decoration representing a thong wound round the haft. Magd. 1–2.

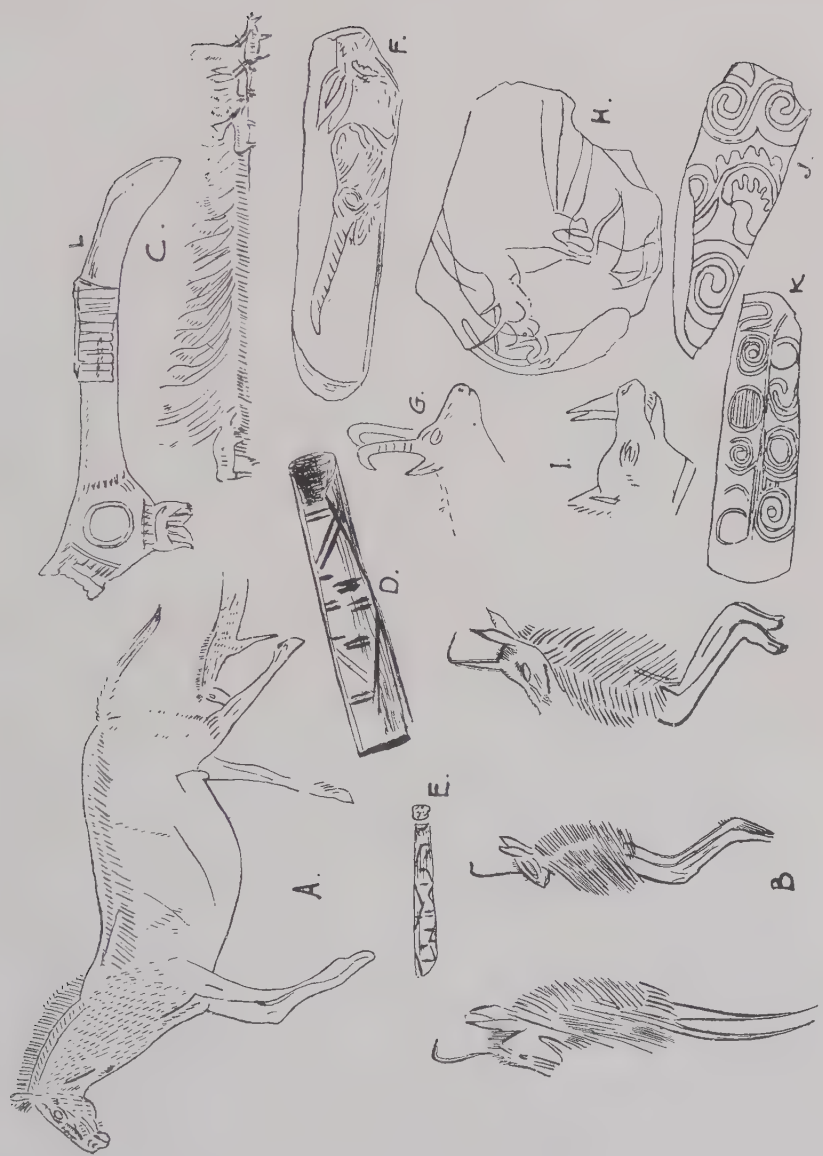
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PLATE XXXI. CONVENTIONALISATION.

After Breuil.

A. Engraved simplifications of heads of ibex and stag.

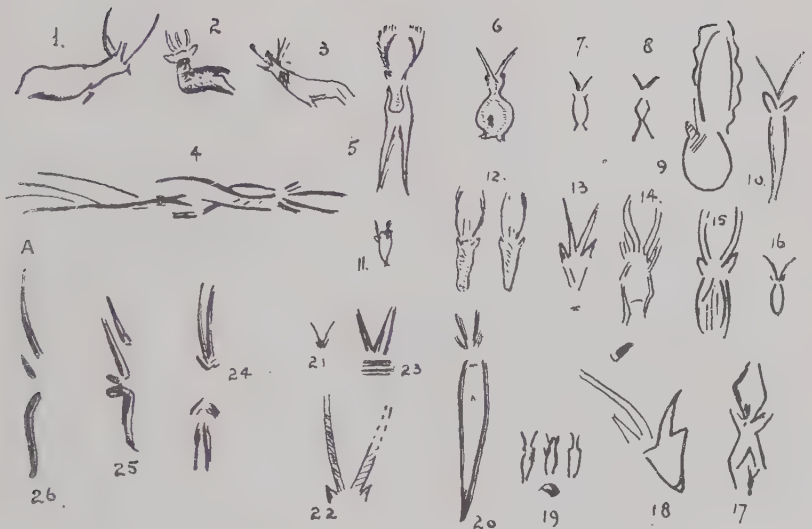
1, 2, 3, 5 from Gourdan (Ht. Garonne).
19 from Lorthet (Ht. Pyrénées).
4, 18, 20, 24 from Mas d'Azil (Ariège).
6, 8, 11, 14, 15, 17 from Laugerie Basse (Dordogne).
10, 25, 26 from La Madeleine (Dordogne).
7, 9, 16, 21 from Raymonden (Dordogne).
12 from Teyjat (Dordogne).
13 from Souci (Dordogne).
23 from Reilhac (Lot).
22 from Marsoulas (Ht. Garonne).

Note. In the place of the trident that characterises the conventionalisations of horses there are four prongs figured, representing the two ears and the two horns of the animal. The horns are always the most prominent.

B. Simplified heads of ox or bison.

1, 7, 8 from Bruniquel (Tarn et Garonne). The specimens are in the British Museum.
2, 3, 4 from Altamira (Cantabria). Painted in black.
5 from Laugerie Basse (Dordogne). 6 from Gourdan (Ht. Garonne).
9 from Mas d'Azil (Ariège). 11 from Raymonden (Dordogne).
10, 12 from Lourdes (Ht. Pyrénées). 13 from Placard (Charente).
14 from Maszycka (Poland). 15 from Laugerie Haute (Dordogne).
16 from Cambous (Lot). 17, 18, 19 from Arudy (Basses Pyrénées).

Note. Figures derived from the horns of the animals and from the eye.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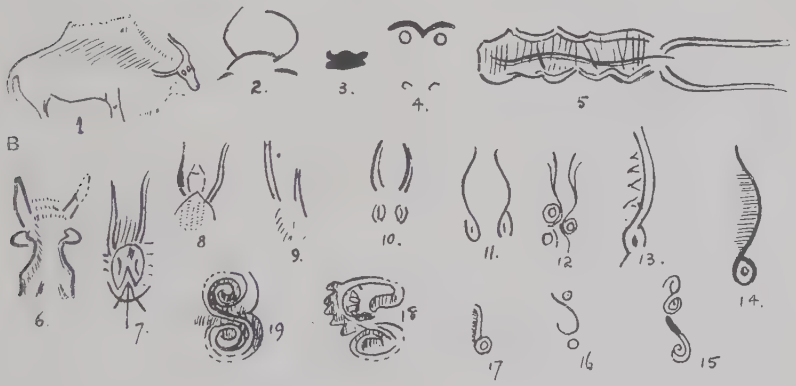
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PLATE XXXII. CONVENTIONALISATION.

After Breuil.

A. Three heads of caprides from Massat (Ariège).

B. (All much reduced in size.) Engraved simplifications of horses' heads.

1 and 2 from Gourdan (Ht. Garonne).
5 and 11 from Mas d'Azil (Ariège).
13, 18, 19, 23 from Lacave (Lot).
4, 9, 14, 15, 16, 20 from Laugerie Basse (Dordogne).
3 from Raymonden (Dordogne).
17, 21, 22 from Marsoulas (Ht. Garonne).
7, 8, 12 from La Madeleine (Dordogne).
6 from Jean Blanc (Dordogne).
10 from Bruniquel (Tarn et Garonne).

Note the characteristic feature is a trident indicating the two ears and mane of the horse.

C. Conventionalisation of sculptured horses' heads.

1 sculptured in bone from Brassempouy (Landes).
2, 3, 4 in lignite from Thaingen (Switzerland).
5 in ivory from Mas d'Azil (Ariège).

Again note the occurrence of the typical trident.

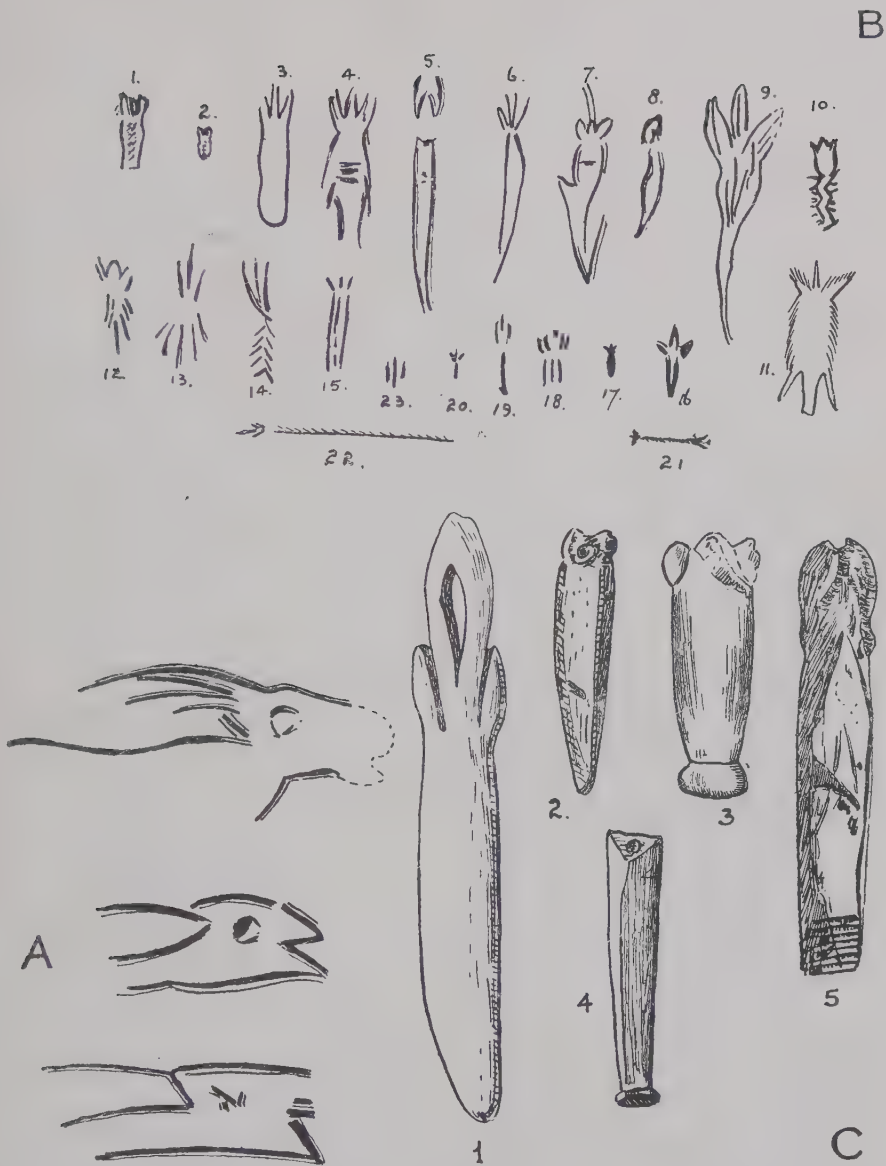
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PLATE XXXIII. CONVENTIONALISATION.

After Breuil.

All natural size.

A. Caprides: 1–3 and 7. Figures in various stages of simplification of the whole animal.
Hinds: 4 and 5. In the latter the artist has omitted the top portion.
Simplified horned heads: 6 and 8.

B. Caprides: 1–5. Simplified heads.

C. Horses: 1–7. Simplified heads.

D. Heads in profile with horns.
No. 2. Natural size, on a bone found at Fontarnaud (Gironde).
Nos. 1 and 3. *Twice the natural size.*

E. Degenerated heads in profile.

F. 1. A simplified horse head.
2–4. Ornamental patterns derived from 1.

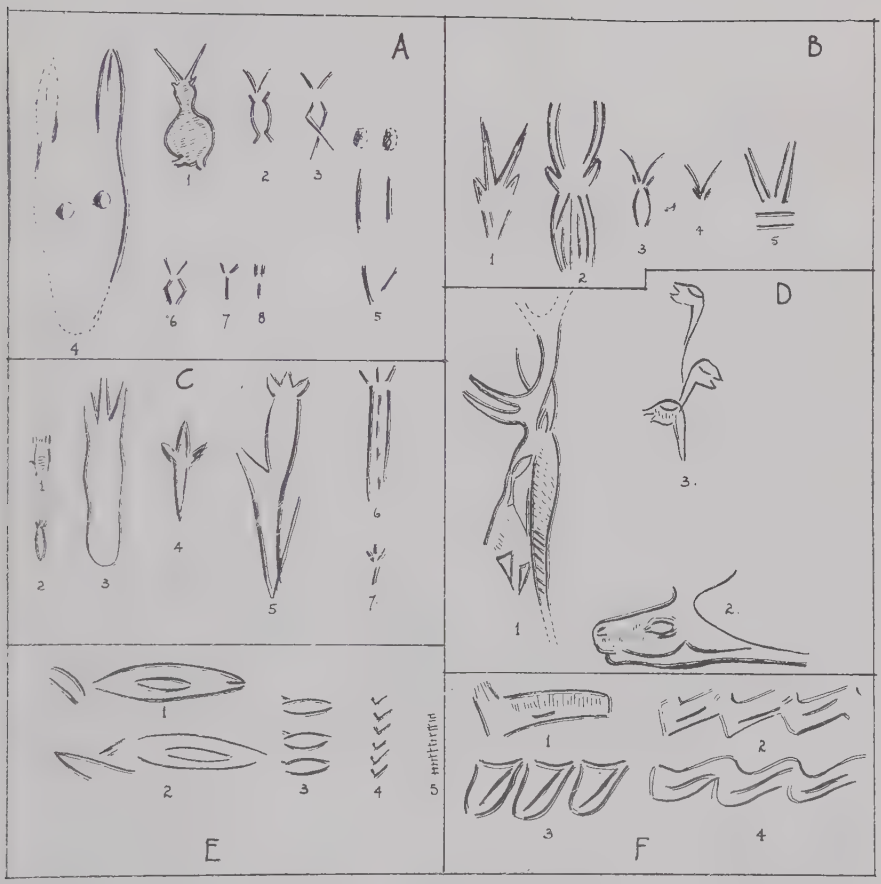
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PLATE XXXIV. EASTERN SPANISH STYLE OR THE SPANISH GROUP 2.

A, B, C, D after Breuil; *E* after Obermaier.

All the paintings of Spanish Group 2 are much smaller, on the average, than those of the ordinary group of Palaeolithic drawings.

A. The hunter and the chamois from the rock shelter of Tortosilla, near Alpera (South-east Spain). The chamois is the only animal with erect horns and ears going backwards. The occurrence of chamois as far south as the province of Albacete is a proof of the antiquity of this group.

B. The "dance" at Cogul (18 k. south of Lérida, North Spain). The central figure is not in a position for the group to represent a phallic scene. The figures at the top right-hand side represent a hunter and a bison. The presence of this animal is a proof of the antiquity of this group. At the top left-hand corner there is a conventionalised scene of a hunter and a stag and a stag dead on its back upside down (?) These are of the Spanish third group and are of Neolithic or Eneolithic age. Below are women and cows belonging to the Spanish Group 2.

C. From the Cueva del Queso, near Alpera. Note the painting of an elk in the top left-hand corner; still another proof of the antiquity of this group.

D. Painted bulls from one of the rock shelters at Albarracin. Note the human figures conventionalised, but of the same age as the bulls.

E. A "hunt" in the Eastern Spanish group from the *barranco* (i.e. watercourse, dry in summer) of Valltorta (Castellón).

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PLATE XXXV. PAINTINGS FROM CANTOS DE LA VISERA.

After tracings by Breuil.

Palaeolithic paintings of the Eastern Spanish style from the rock shelter of Cantos de la Visera (Albacete). The conventionalised figures of animals and humans belong to the later (Spanish third group) age. Note the painting of a couple of birds; also of a bull in light red that has been repainted as a stag in chocolate at a slightly later date. There are also cows and horses, the latter important as they can be directly compared with the little horse painted at Portel among an ordinary Northern Palaeolithic group of paintings.

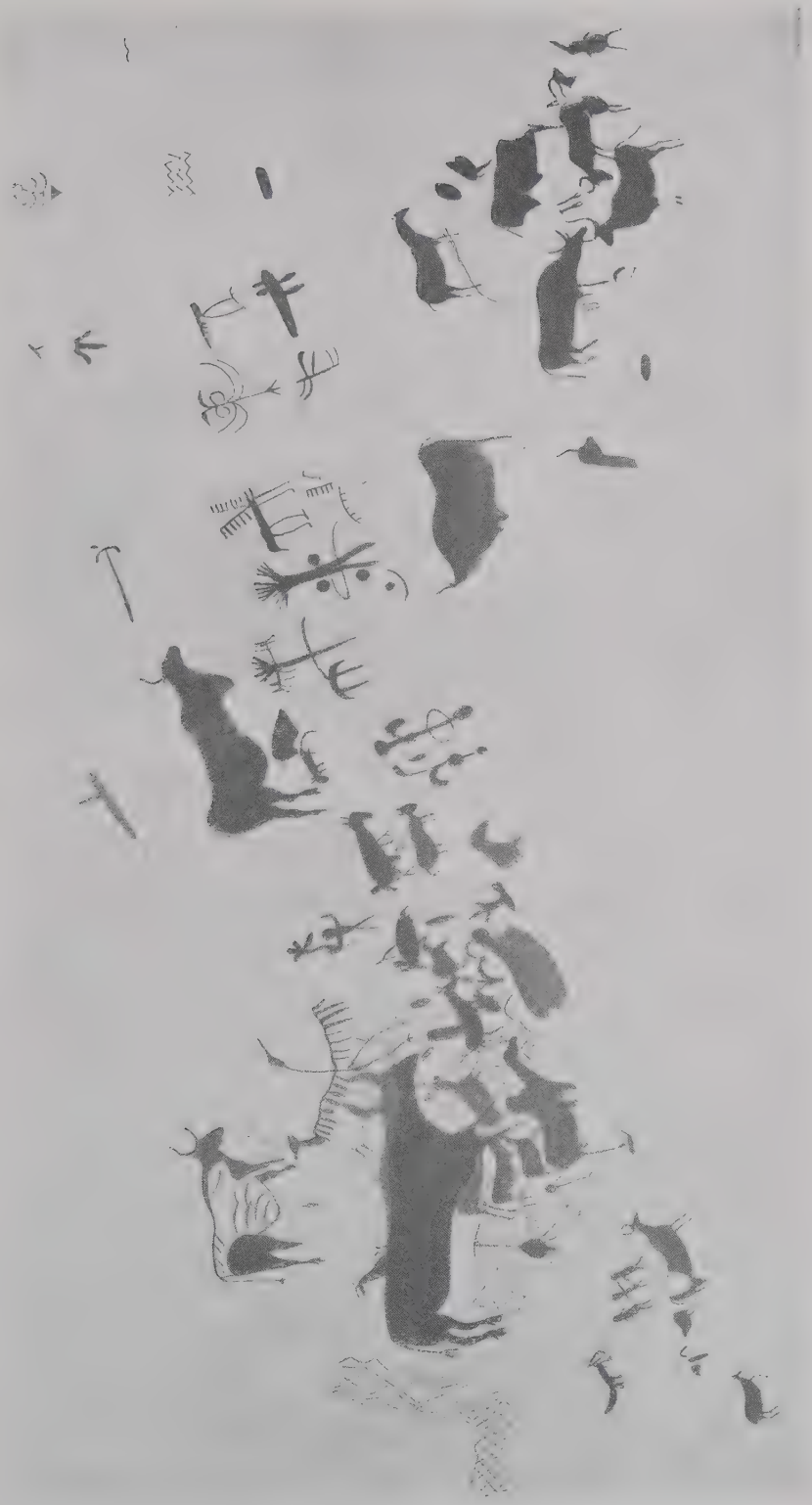

PLATE XXXVI. SPANISH THIRD GROUP, ANIMALS AND PAINTED PEBBLES.

The first three series are after Breuil; Peña Tú after Cabré; and the painted pebbles after Dr Obermaier.

Human beings, some leading beasts, others with bows, etc. From rock shelters in the Sierra Morena.

From La Pileta (South Spain). The naturalistic animal figures, including the painting of a fish, are of late Palaeolithic age; the geometric figures belong to the Spanish third group and are of Neolithic or Eneolithic age.

From the rock shelter of Val de Junco at the Esperanca, near Arronches (Portugal). The painting of a rhinoceros from its state of preservation is older than the rest and may even be of Palaeolithic age. The other figures belong to the Spanish third group.

From Peña Tú (Cantabria). Note the dagger with rivets indicated, i.e. a painting of a metal dagger. Also the coffin-shaped idol similar to those that are found figured on megalithic tombs, etc. The human figures and the punctuations are similar to those found in the Spanish third group and Peña Tú is probably of the same age or only slightly later.

A small series of painted pebbles from Mas d'Azil. These have been discussed in the text and their meaning is unknown.

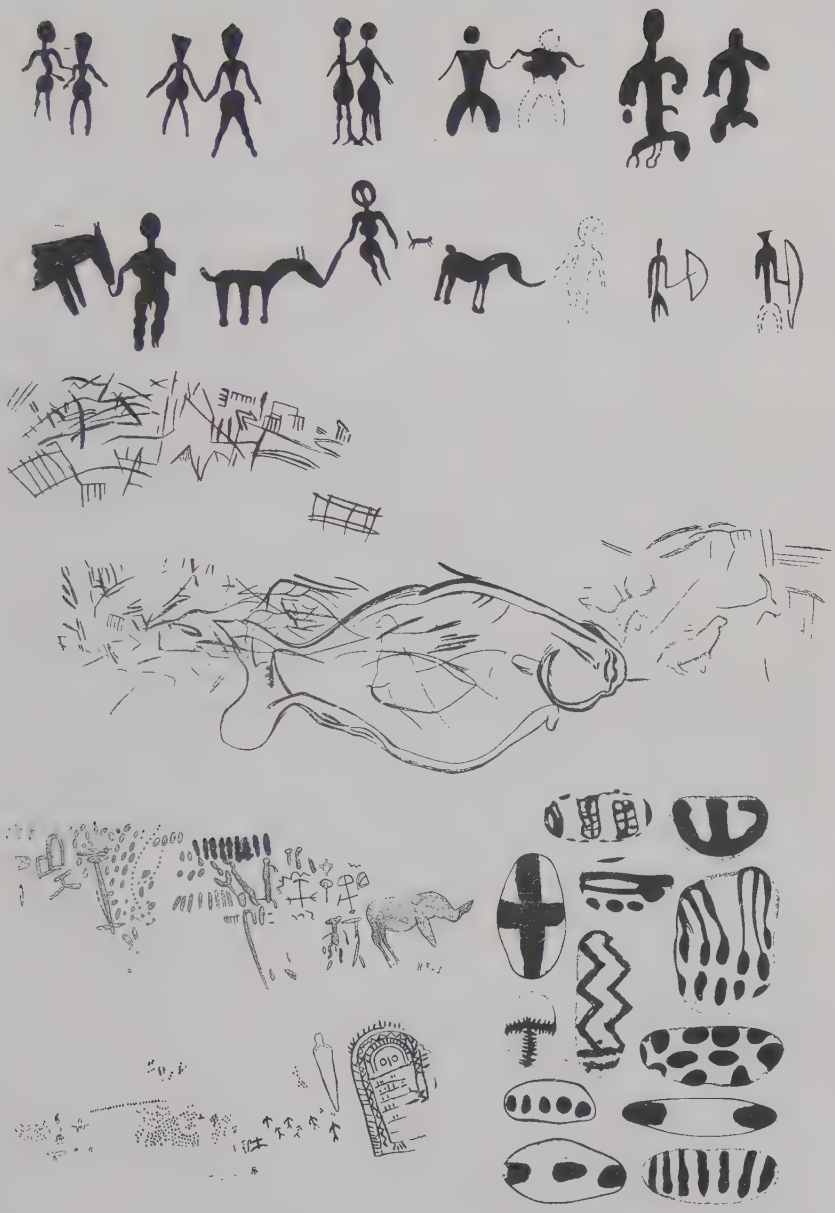

PLATE XXXVII. SPANISH THIRD GROUP, LAS FIGURAS.

After photographs by the author.

Paintings of the Spanish third group at Las Figuras (Laguna de la Janda, South Spain). There are something like 507 paintings in this rock shelter. Note the direction of the tines of the antler which differs from that of the Velez Blanco region (see the text). There is also the painting of a man armed with what must have been a metal axe. This is not shown in the reproductions but is important to remember as helping to date this group. In the inset the mouth of the short cave is seen as a black smear, just a little above the cottage to the right. The cave opens about 15 feet from the ground up the side of the cliff.

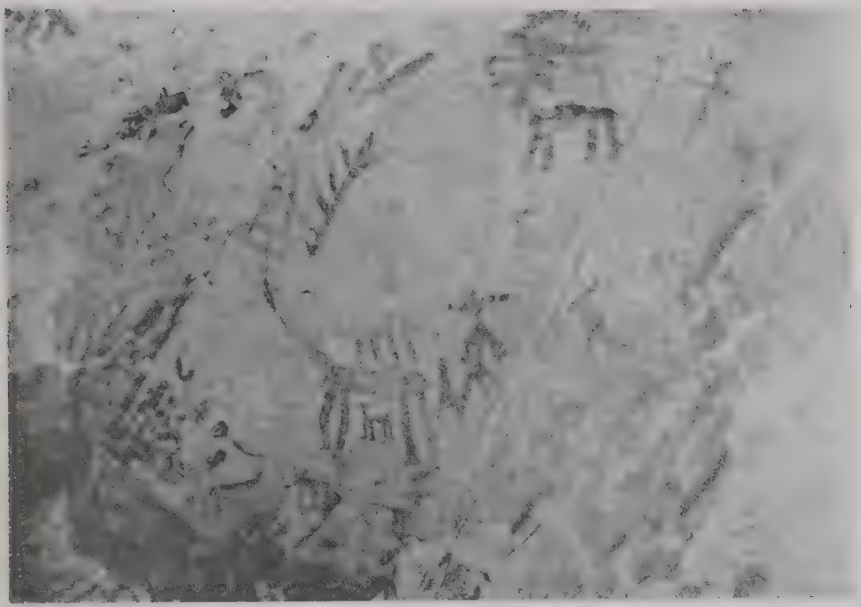

PLATE XXXVIII. SPANISH THIRD GROUP. CONVENTIONALISED HUMANS (NEOLITHIC AND ENEOLITHIC).

After tracings by Breuil.

Examples of conventionalised human figures from the Spanish third group. A series can very easily be made out showing how the various conventions are evolved. Notice the circle with vertical line type at the top of the plate. Further down there is the horizontal D form with a vertical line drawn from it. This type is found, as well as circle and vertical line type, at one place in Ireland, on a stone near Clonfinlough, some miles from Athlone. The carved figures are deeply cut and are thought by Breuil to be the earliest of the Irish prehistoric art series. Hour-glass forms are also to be seen. A stage in their evolution is well seen in row three from the top and the third figure from the end. Finally the student will find the "skeleton" varieties well represented. The drawings are all small in this group, being rarely more than a foot or so in length

PLATE XXXIX. SPANISH THIRD GROUP. HUMANS.

After tracings by Breuil.

Devils from Peñon de Graja, Miranda del Rey (Sierra Morena, Spain).

Below there are a number of conventionalisations of the human form represented. The top row is from the Sierra Morena; those underneath to the right from the little rock shelter of Gabal, near Velez Blanco (South-east Spain); those underneath to the left from Castillo (Cantabria). The first two series belong to the Spanish third group, while those from Castillo cannot be dated, but may be of an earlier age.

PLATE XL. IRISH TUMULUS ENGRAVINGS AND DEPOSIT AT PILTDOWN.

After photographs by the author.

A–C. Engravings on the stones of the little tumulus at Sesskil-Green, near Ballygawley (Co. Tyrone, Ireland). The engraved lines have been chalked so as to be visible to the camera. The tumulus consists of a ring of stones on the top of a little mound. The whole is to-day overgrown with brambles.

D. One of the engraved stones at Knockmany, near Clogher (Co. Tyrone, Ireland). The tumulus, of which this is one of the circle of stones, is placed on the top of a high hill with a magnificent view nearly all round. A glorious place for the tomb of some great chief.

E. A large dolmen a little to the south of Dublin. Near it are Professor Macalister, of the National University, Dublin, and Professor Breuil, of Paris. The huge table was probably quarried from the hillside at the back, which slopes up behind the photographer.

F. A section at Piltdown close to where the famous skull was found. The portraits are of Dr Smith Woodward, of London, and Professor Breuil, of Paris.

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PLATE XLI. SCANDINAVIAN GROUP 1 AND SPIRALS.

A and *C* after Hallström; *B* and *D* 2 after photographs by the author; *D* (1 and 3) after Hoernes.

A. The rock carvings at Bardal (north of Trondhjem). The semi-naturalistic figures of animals, etc., belong to the earlier West Scandinavian group, while the figures of ships belong to the Bronze Age group of rock carvings that are so common in South-west Sweden. The super-position is here quite clear and the West Scandinavian group is the earliest.

B. Carvings of the West Scandinavian group of semi-naturalistic animals at Bögge in Langfjord in Norway. The carvings are made on intensely hard glacier-worn surfaces of rock. So hard is the rock that a metal knife makes no impression. Note the peculiar method, often used in this group, of prolonging the lines of the legs right up to the line of the back.

C. Figures of conventionalised human beings from Leka (Norway). These also belong to the West Scandinavian group.

D. 1 and 3 show examples of the engraved pottery from Butmir (Sarajevo, Bosnia). The site, judging by the archaeological contents, is dated as Early Neolithic. The occurrence of spirals as decoration at this place is perhaps to be correlated with the spiral decoration on pots that was made in Egypt in Predynastic times. 2 is the painting of a spiral in a small rock shelter in South-west Spain. Is it to be assigned to a similar culture as the Butmir spirals? If so a part at least of the Spanish third group is really of Neolithic culture. Spirals also occur engraved on a temple in Malta, which had been covered by aeolian (i.e. wind borne) deposits, in which early Bronze Age implements were found. The date of the spirals on the temple cannot, then, be later than late Neolithic. We therefore find the following spiral decoration culture-drift in early times:

At Butmir (E. Mediterranean), of early Neolithic age.

At Malta (W. Mediterranean), of late (?) Neolithic age.

In South Spain, of Eneolithic age.

In Ireland, on tumuli of Bronze Age.

A
B
C
D
2
3

PLATE XLII. SCANDINAVIAN GROUP 2 (BRONZE AGE).

From photographs by the author.

Battle scene with men on horseback from Tanum parish, Bohuslain in South-west Sweden. Everything white (chalked) has been carved to a considerable depth in very hard rock. This scene has given rise to much controversy as to its age. On the one hand it seems impossible to divide it off from the acknowledged Bronze Age carvings near by, while on the other the use of cavalry at so early a date seems a bar to it being itself of the Bronze Age.

Scene of bulls, a plough scene and men, one of whom is armed with a bow and arrow. From Tanum parish, Bohuslain, in South-west Sweden. It is not far off from the battle scene. It would seem to be of the Bronze Age and the plough scene is to be compared to a similar one in the group of engravings of the Alpes Maritimes.

Three ships from near Lysekil (north of Göteborg). The double prow and the considerable height in comparison to the length may be due (as Dr Haddon has suggested) to the fact that boats are shown loaded on sledges. That boats must have been carried overland on sledges is clear from the burials inland of chiefs together with their ships.

PLATE XLIII. ENGRAVINGS ON ROCKS BORDERING LAKE OÑEGA IN NORTH RUSSIA.

Reduced from tracings made by the author.

Engraving of a devil over ten feet long. The Russian cross carved over the left hand is modern and there is a legend that it was made a long time ago by the people of the village some little distance away to avert evil. The patina of the cross is fresh and quite different from the rest which has the same patina as the rock around.

To the right there are two birds figured upside down, as well as another to the left. Further to the left there is also the figure of a sturgeon.

In the inset there is the figure of a man throwing a harpoon. Below is a sort of throwing stick.

Note that everything black has been cut out of the rock to the depth of over a centimetre. The rock is so hard that a metal knife makes no impression.

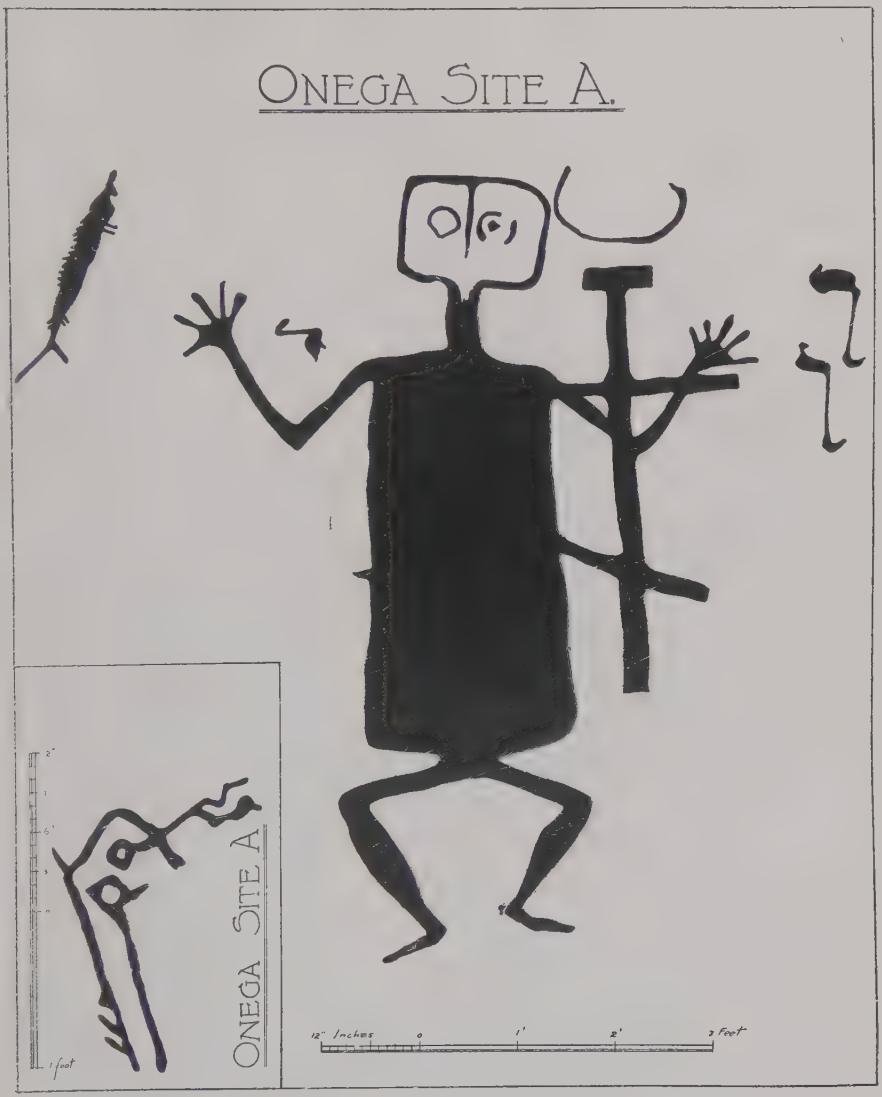

ONEGA SITE A.
ONEGA SITE A
12" Inches
0
1'
2'
3 Feet
1 foot

PLATE XLIV. ENGRAVINGS ON ROCKS BORDERING LAKE OÑEGA IN NORTH RUSSIA.

Reduced from tracings made by the author.

The sites are of no importance, merely referring to local capes and bays on which the engravings occur. The whole group is found over a very short distance of shore line.

1. Represents some sort of phallic scene.
2, 3. Indeterminate figures.
4. Wheel figure of unknown meaning. Also a sign that may be meant for a mirror or for a phallic representation.
5. Mirrors (?), etc., and a long figure that is very common, the meaning of which is unknown, unless an oar is intended. The side projection seems here to be meant for an animal's head.
6. A man armed with a spear. Also mirrors and other signs.
7. An animal, a mirror (?) and a family of young birds led by their mother.

Note that everything black has been cut out of the rock to a depth of over a centimetre. The rock is so hard that a knife makes no impression.

ONEGA

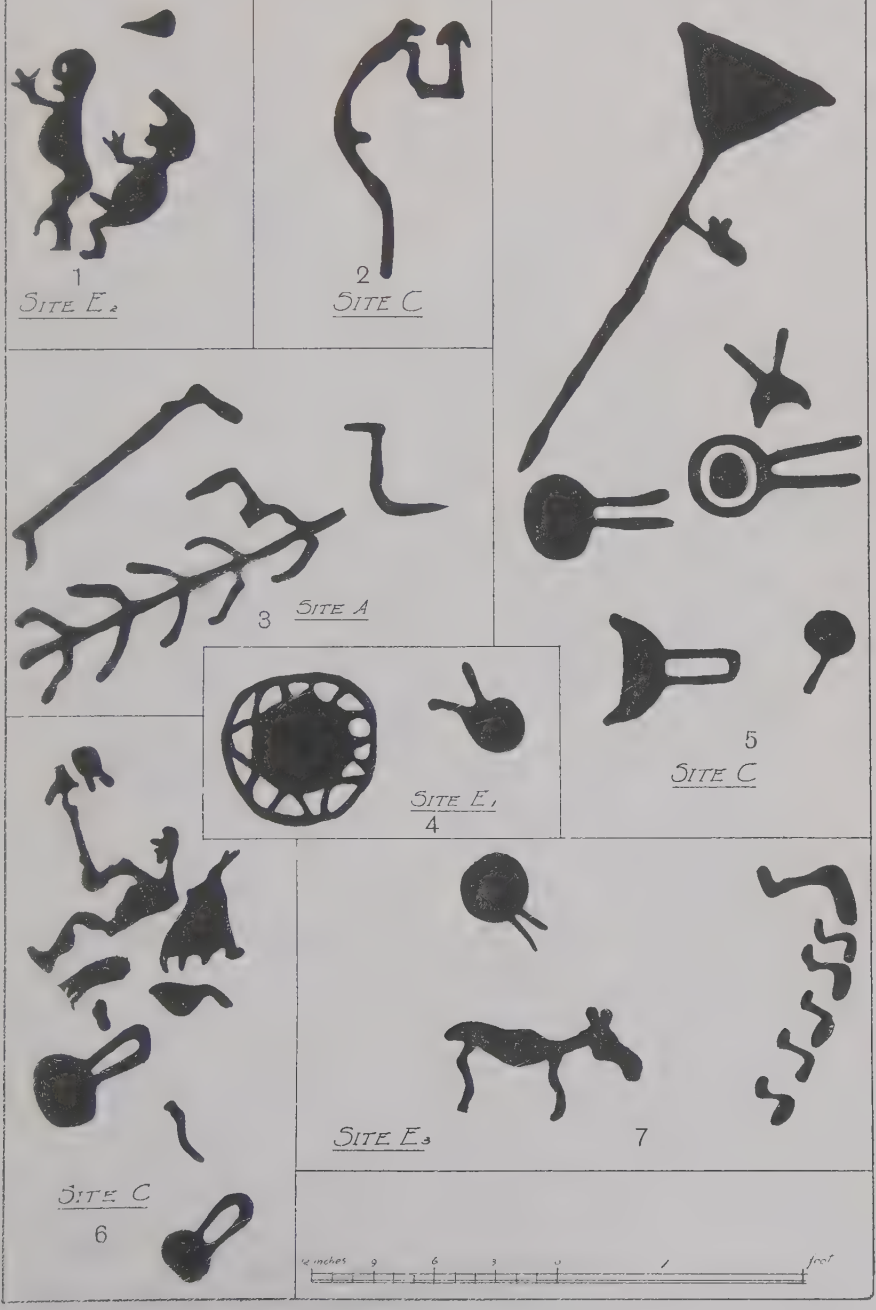

1
SITE E 2
2
SITE C
3
SITE A
SITE E 1
4
5
SITE C
SITE C
6
SITE E 3
7
12 inches
9
6
3
0
1
foot

PLATE XLV. ENGRAVINGS ON ROCKS BORDERING LAKE OÑEGA IN NORTH RUSSIA.

Reduced from tracings made on the spot by the author.

In the left-hand panel, swans, a boat and a man are represented.

In the right-hand panel there is a swan, a fish, a lizard (?) and an unfinished reindeer (?).

Note that everything black has been cut out of the rock to a depth of over a centimetre. The rock is so hard that a metal knife makes no impression.

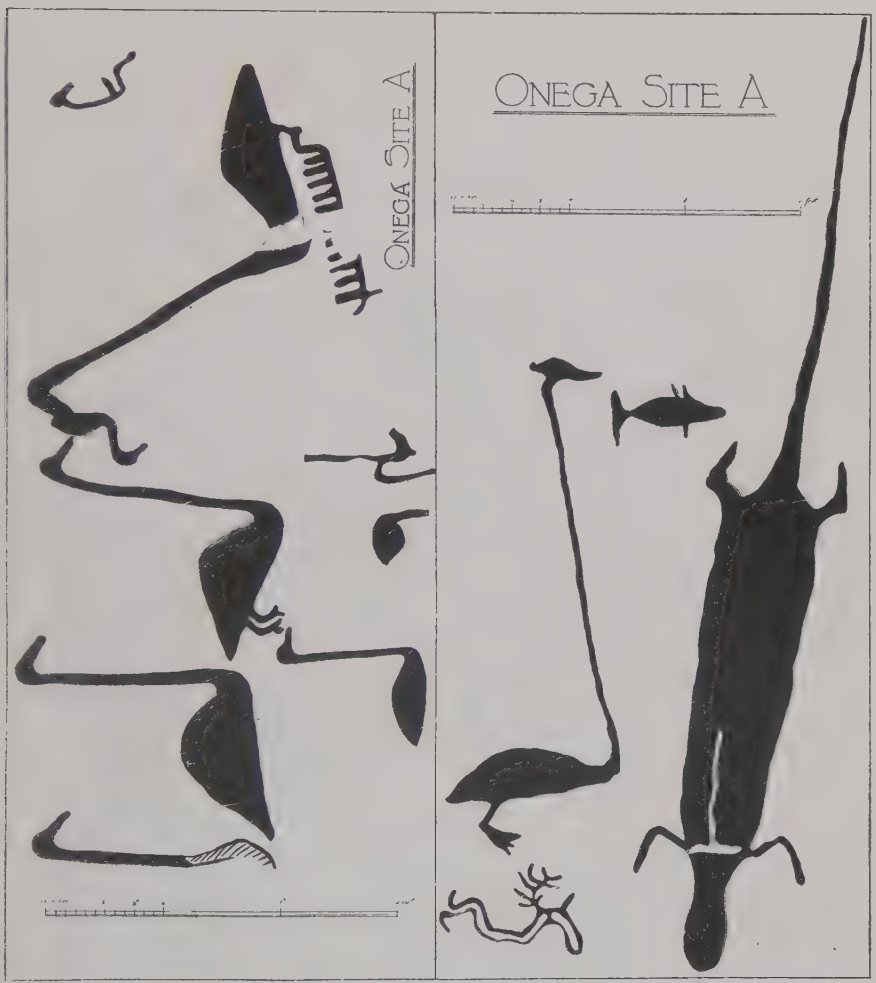

ONEGA SITE A
ONEGA SITE A

PLATE XLVI. ENGRAVINGS ON ROCKS BORDERING LAKE OÑEGA IN NORTH RUSSIA.

Reduced from tracings made by the author.

In the left-hand panel there are a number of signs and animal and human figures. Some of these are intelligible, others are not. The carvings are arranged anyhow and grouping is not common. The round circle with the two lines drawn from it may be meant for a metal mirror.

In the right-hand panel there is what may be meant for a birth scene (?). An animal is also figured and another attacked by a hunter armed with a spear. Of the other figures one may be meant for a mirror, but the others are unintelligible. The long figure is common at Oñega and may represent an oar.

Note that everything black has been cut out of the rock to a depth of over a centimetre. The rock is so hard that a metal knife makes no impression.

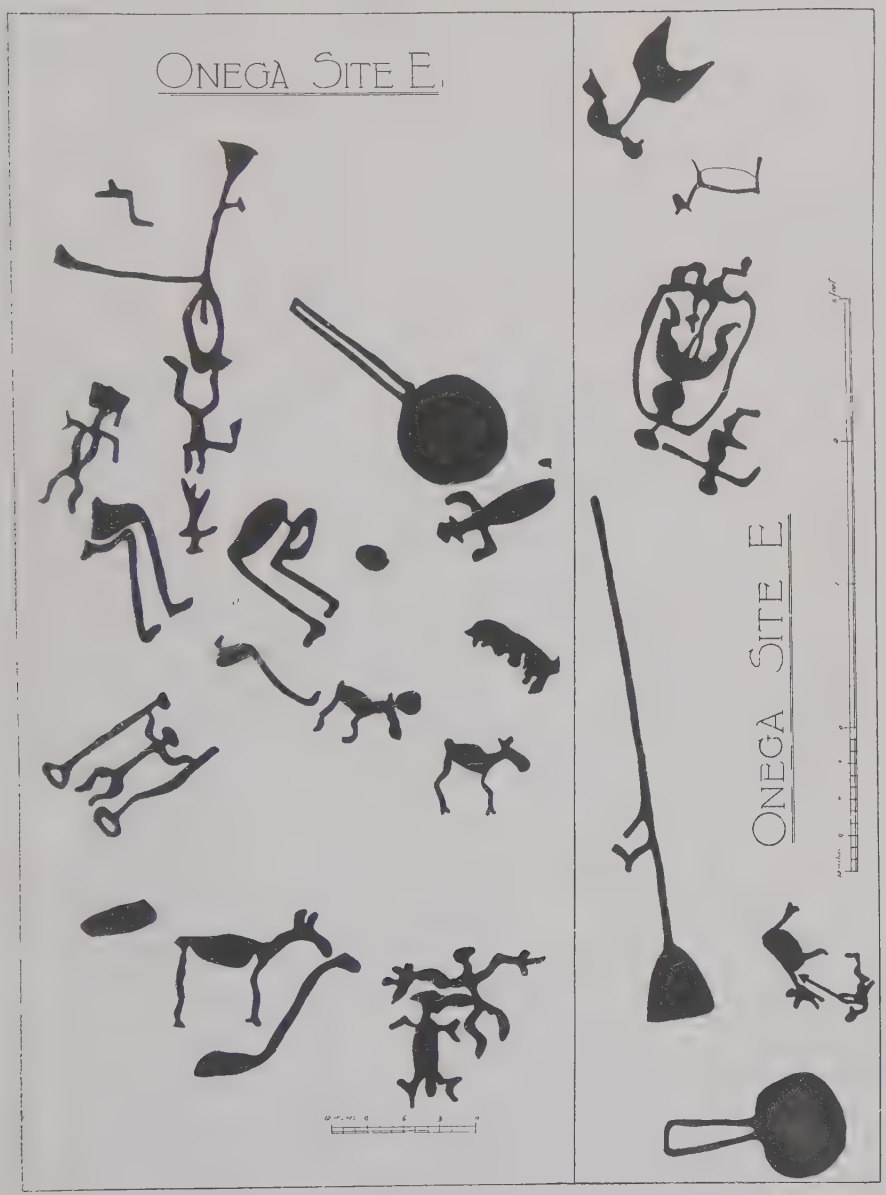

ONEGA SITE E.
ONEGA SITE E

PLATE XLVII. ENGRAVINGS ON ROCKS BORDERING LAKE OÑEGA IN NORTH RUSSIA.

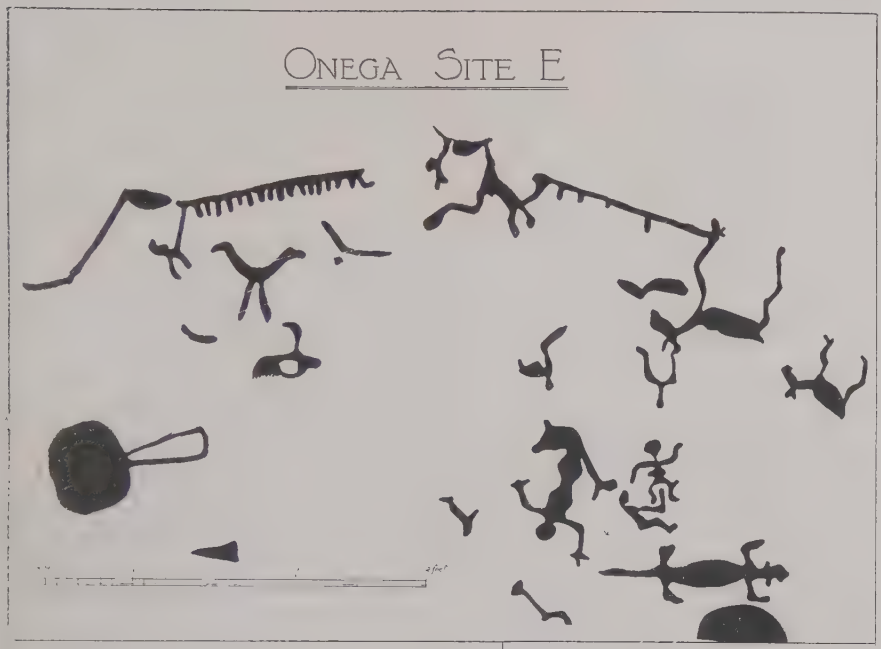
Reduced from tracings made by the author.

In the top panel there are ships with animals' heads as prows; this is characteristic of the Russian engravings. There is also a carving of what may be meant for a mirror. There are also animals, men, a swan and a sort of lizard.

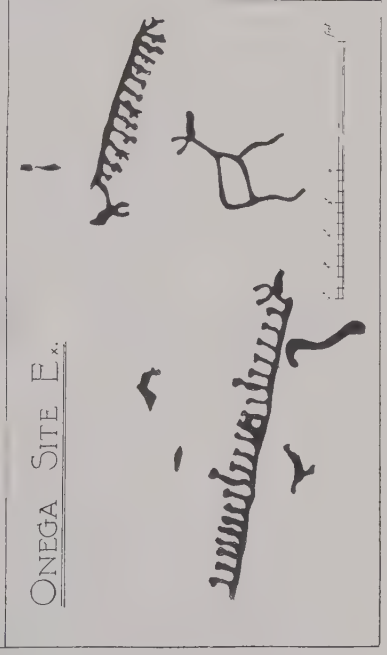
In the bottom left-hand panel there is a mirror, animals, men, a ship and a long figure of unknown significance, perhaps meant for an oar.

In the bottom right-hand panel there are two ships and an animal.

Note that everything black has been cut out of the rock to a depth of over a centimetre. The rock is so hard that a metal knife makes no impression.


ONEGA SITE E

ONEGA SITE E.


ONEGA SITE Ex.

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